A Bibliography on the River Nile

Vol. III

Nile Plans and Nile Reports 1960-2006

Partially Annotated

Terje Tvedt with Eirik Hovden

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Contents

INTRODUCTION

This bibliography of Nile plans and Nile reports contains approximately two thousand entries. It is an extension of the chapter "Projects and Reports" in Terje Tvedt's *The Nile. An Annotated Bibliography* (IB. Tauris: New York/London 2004). The present book focuses on the period 1960 – 2006, since Tvedt 2004 focused on plans and reports produced during the period when Britain was in control of Nile developments.

Optimal utilization of the long and mighty River Nile requires knowledge about how the river has been projected and planned for in the different countries. Therefore we think that an overview of all the plans and projects is crucial for a rational development of the river in the future. We hope that this bibliography will be useful to politicians, planners, researchers, journalists and the public at large.

This bibliography registers not only published literature, but also plans and unpublished reports. It ranges from short notices about internal administration affairs related to specific projects to the more voluminous studies and plans, often made by Western consultancy companies. As the thematic focus is "plans and reports for utilization of Nile waters" topics like fisheries, the water hyacinth problem and water-health issues have been left out. Our aim has been to compile an extensive list of literature on plans and reports that deal with irrigation, hydropower, dam building, canal building, drainage and land reclamation.

Some of the entries do not have a specific publisher. If there is no publisher, the actual plan or report is usually owned and kept by the institution that commissioned it. In general this will be the respective national ministry or ministries responsible for water and hydroelectric issues. Many of these plans and reports can be found in different libraries and archives, and possible locations are indicated in the annotation of many of the entries. Again, due to the variable nature of the sources, their accessibility also varies greatly. Since many of the reports and plans have been controversial and of a non-public character, many of the entries in this book cannot be found in internet-based library catalogues. The bibliography therefore gives information of the institution that commissioned the studies, so as to meake it easier to get hold of them.

The bibliography is sorted alphabetically according to 1. country where the plan/project should be/was implemented; 2. year of publication; and 3. author's surname or the institution's or company's name. Some entries dealing with projects relevant to more than one country, for example the Rusumo Falls Hydropower project, is typically placed under both "Rwanda", "Burundi" and "Tanzania". Entries concerning Lake Nasser have been placed under "Egypt" unless the document explicitly deals with phenomena related to the Sudan such as the resettlement of the Nuba population.

Sources

The sources for this bibliography are many. The bibliographies by Terje Tvedt on the Nile and on the Southern Sudan have been important. References and sources of a great number of books and articles about the Nile have been reviewed and included in the bibliography. In addition to the Nile related libraries and archives listed in the two bibliographies by Tvedt (2004), the following libraries were visited:

Library of the Ministry of Water Resources and Irrigation, Egypt,
Nile Basin Initiative Library, Entebbe, Uganda,
Makerere University Library, Uganda
Ministry of Agriculture, Animal Industry and Fisheries, Uganda,
Archives and library of the Ministry of Irrigation, Wad Medani, Sudan,
Archives of the Permanent Joint Technical Committee for Nile Waters, Khartoum.
Library of the University of Khartoum
Library of the Ministry of Water Resources, Addis Abeba, Ethiopia

Several public offices in Egypt, Uganda and Sudan were also visited in search of literature and reports and to enquire for further suggestions.

The help provided by the Ministry of Water Resources and Irrigation, Egypt was especially helpful.

A number of persons knowledgeable about Nile issues has been contacted, too many to name them all. The material and contacts provided by the first research group at the Nile Basin Research Programme at the University of Bergen, Norway, spring 2007, have also been important. When a reference is accompagnied by the following: "This report has been scanned by Jacobs, Reading, UK, (former Sir Alexander Gibb and Partners) and can be obtained from their electronic archive" it means that a scanned copy of the actual report is available in their electronic archive.

Internet library catalogues have also been used. "Worldcat", for instance, has been important. It covers Western electronic library catalogues. None of the libraries in the Nile Basin are connected. The Egyptian Library system may be accessed electronically, the same is the case with Makerere University Library, Uganda and the Nile Basin Initiative Library, Entebbe, Uganda.

Terje Tvedt and Eirik Hovden Bergen, December 2007

BURUNDI

Hydroplan Ingenieur-Gesellschaft mbh and Fichtner Beratende Ingenieure, *Étude finale de faisabilité du projet hydroagricole et hydroélectrique de Kaganuzi C, Rapport préliminaire de Seconde Phase, Tome I, Rapport de synthèse et volets hydro-agricole, organisationnel, électrique et économique.* Burundi.

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A. Bodeux, 1965. *Le bilan d'eau dans le bassin hydrographique de la Karuzi au Burundi*. Bruxelles, Centre d'écologie humaine de l'Institut de sociologie de l'Université libre de Bruxelles.

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This report was commissioned by the United Nations. RAF-71-147 Sectoral and prefeasibility studies:
vol 1 Power market
vol 2 Evaluation of existing project
vol 3 Hydropower potentials of Burundi (including other basins)
vol 4 General agriculture
vol 5 Ecology
vol 6 Human infrastrucure
vol 7 Hydrology
vol 8 Transportation
vol 9 Kagera River Hydropower developments, Rusumo Falls, Kishanda
vol 10 Nakaka livestock project
vol 11 Kayaka irrigation project
vol 12 Reclamation of Bukumba, Kajaj and Kaskuma v.
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Norconsult A.S./Electrowatt, 1976. *Rapport Technique, Volume 13 – Aménagement du Bassin de la Rivière Kagera, Phase II – Burundi, Rwanda, République Unie de la Tanzania – Etude Sectorielle, Plan Indicatif du Bassin.* Burundi.

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HEP Final review report. Burundi.

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SNC-Lavallin International, Hydro Quebec International, World Bank and CIDA, 2005.

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This report was commissioned by the Nile Basin Initiative, NELSAP.

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Sherif Ahmed Kamal Abd El-Aziz, Management of Drainage Water of El Nasr-3 Main Drain and its Branches.

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This book by the then Under-Secretary of State starts with the following sentence: 'Egypt is by nature a rainless desert which the Nile, and the Nile only, converts into a garden every year'. Offers a broad overview of the irrigation projects implemented and planned in Egypt at the time. Mostly concerned with Nile projects within Egypt's borders.

Abdel-Aziz Ahmad, 1938. *Hydroelectric Power Development on the Nile as a Stepping Stone to the Industrialization of Egypt*. Vienna, World Energy Conference.

A.J. Dorra, 1938. l'Aménagement hydro-éléctrique du Barrage d'Assouan. *L'Egypte Contemporaine* 29(179-180; November-Desember): 549-648.

Y.M. Simaika, 1940. *Filling Aswan reservoir in the future*. Cairo, Egypt, Schindler's

Press.

One of many papers on Nile issues by the Egyptian expert who co-authored Nile basin studies with Hurst and Black.

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A position paper by the Egyptian government on the Nile Basin, Volume VII.

H.E. Hurst, 1948. Major Irrigation Projects on the Nile. *Civil Engineering and Public Works Review* 43(507): 450-452.

A short description of the projects which were being discussed in the technical negotiations between Egypt, Sudan and Uganda in the late 1940s, and an attempt to show how they formed a part of a 'scheme for the full development of irrigation from the Nile'. Argues that the Sudd Canal will 'have a very great effect on the Sudd region and its inhabitants, especially as the effect of regulation will be to inter-change seasons' (p. 452), but that on balance the canal and reservoir in Lake Albert will be of great benefit to the riparian population.

Y.M. Simaika, 1948. *Century storage reservoirs and the complete control of the Nile*. Oslo.

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A personal account of the history of Aswan Dam politics in the interlude between the Suez crisis and the start-up of the building of the Aswan High Dam.

Naguib Boulos, 1959. *Silt in the Aswan Reservoir*. Cairo, General Organisation for G.P.O.

United Arab Republic, Ministry of Public Works, Egypt. Includes bibliographical references.
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A.M. Ibrahim, 1974. *Reply to Points Raised by Opponents to Jonglei Canal Project.* Khartoum, Sudan

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Yahia Abdel Mageed, 1974. *Statement to the People's Assembly on the First Phase of Jonglei Project.* Khartoum, Sudan

L.G. Massaia, 1974. The White Nile, its people and its source, The state of European knowledge in 1851. *The opening of the Nile Basin*. E. Toniolo and R. Hill. London, C. Hurst.

Massaia, the Vicar-Apostolic of the Galla in Ethiopia, on his transit through Khartoum in his memorandum to the French Consul-General in Egypt sums up the knowledge of the White Nile and its sources in 1851. He rejects Mr. D'Abbadie's assumption that the river rises in S.W. Ethiopia (this was the Sobat). From Pedemonte's account he assumed that it originated south of Gondokoro and the 4th degree of latitude, possibly in some mountains near the Equator.

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M. Shazali Osman and H.E. El Hag, 1974. Irrigation practices and development in the Sudan. *Sudan Notes and Records* 55: 96-100 (110?).

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The author used what he calls an "ecological imperialism model" based upon cultural materialism, arguing that it is more appropriate than models that had previously guided the study of resettlement schemes. It related the entire social and cultural system of the Gezira scheme to a few basic variables: (1) exchange of information, (2) exchange of energy. Model use is demonstrated through case studies of the Gezira scheme in the Sudan & the Shimba hills scheme in Kenya.

M.A. Rahama Babiker, 1974. *Project Appraisal - a case study. Sennar Sugar Scheme, Sudan*. The Hague.

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H.S. Adam and H.G. Farbrother, 1975. *Three GRS Techniques for the Assessment of 1st. Watering requirements of crops planted on Gezira Clay.* GRS (mimeo), Sudan.

Abel Alier, 1975. *Statement to the People's Regional Assembly on the proposed Jonglei Canal*. Khartoum, Sudan, Government Printing Press.

A forceful, official statement arguing in favour of the Jonglei project proposed by the Nile Water Commission in May 1974. It says that the Jonglei Canal Investigation Team identified and recognized the right of the peoples in the area, but that it shied away from development of the area and recommended ways and means that would maintain the subsistence economy of the region.

T. Barnett, 1975. The Gezira Scheme: Production of Cotton and Reproduction of Underdevelopment. *Beyond the Sociology of Development*. I. Oxaal and et al. London, UK, Routledge and Kegan Paul.

Hassan Dafalla, 1975. *The Nubian exodus*. London and New York, C. Hurst, in association with the Scandinavian Institute of African Studies, Uppsala, Sweden; distributed by Universe Books.

A book about Nubians displaced by the Aswan Dam project between 1960 and 1965.

J. el-Tama, 1975. *The Development of the Managil South-Western Extension to the Gezira Scheme*. Rome, Italy, UNDP/FAO.

S. el-Zein, 1975. The Water resources of the Nile for agricultural development in the Sudan. *Aquatic Weeds in the Sudan with Special Reference to Water Hyacinth*. M. Obeid. Khartoum, National Council for Research; Agricultural Research Council, Khartoum, Sudan**:** 1-9.

The development of the Nile for irrigation and its effect on the natural environment is discussed. Attention is drawn to the ingress of weeds where large bodies of clear water have been created as reservoirs or canal systems. Prepared for the Workshop on Aquatic Weed Management and Utilization, organised by the National Council for Research, Sudan, and the National Academy of Sciences, USA.

H.G. Farbrother, 1975. *Water Requirements of Gezira and Managil, Jun-Oct 1975.* Gezira Research Station, Sudan.

H.G. Farbrother, 1975. *Planting Water Requirements for Wheat, Oct. 1975*.Sudan.

Mohamed el-Awad Galal-el-Din, 1975. *The human factor in the Rahad Project Area: Phase 1. Results of population and socioeconomic survey.* The Democratic Republic of the Sudan. Ministry of Agriculture, Food and natural Resources, Khartoum, Sudan.

The report summarizes a full-count survey of the whole area which was supposed to be affected by the Rahad Project in its First Stage. The statistics are used to describe the size, distribution, socio-economic and demographic characteristics of its population. The aim was to help planning, explicitly criticising the Gezira project for its obsession with 'profit-making' and its policy of investing in land and machines only and not in human beings.

T.T. George, 1975. *Water Pollution in Relation to Aquaculture in Sudan*. FAO/CIFA Symposium on Aquaculture in Africa, Accra, Rome, Italy, FAO, Fisheries Dept.

Symposium paper on water pollution in relation to aquaculture in Sudan, with notes on the problem of pesticides, pollution in the River Nile and related canals.

T.T. George, 1975. National plan for development of aquaculture in the Sudan. *Aquaculture planning in Africa. Report of the first regional workshop on Aquaculture planning in Africa, Accra, Ghana, 2-17 July 1975*. UNDP/FAO. Rome, Italy, UNDP/FAO**:** 98-107.

The proceedings from this first UN-seminar/workshop on regional aquaculture in developing countries is organised into a general main part addressing several issues regarding the topic and an appendix of annexes in which some of the participating countries elaborate on their national plans for aquaculture. The Sudan section gives a brief overview of the existing aquaculture and lists the objectives and areas for future research and development. Of the eight points in this list, two focus on the Southern Sudan: d) Equatoria Province and the Zande area, with the aim of alleviating the chronic deficiency of animal protein, and e) on the Sudd region, to compensate for the loss of production caused by the Jonglei canal. Plans for extension services, pilot projects and technical assistance are set out.

C. Gischler, 1975. *Environmental Consequences of the Jonglei Canal.* UNESCO, Cairo, Egypt; Sudan.

J.P. Herald, 1975. More pumps for irrigation. *APE Engineering*(18): 8-12.

An article about Allen Gwynnes pumping stations which have been widely used in the Sudan (for example at Guneid and Wad-el-Haddad).

A.M. Ibrahim, 1975. The Jonglei Development Project - 1975. *Sudan International* 1: 46-9.

ILACO, 1975. *Pengko Plain Pre-Feasibility Study. Vol. II.* ILACO, Arnhem, The Netherlands; Sudan.

ILACO, 1975. *Pengko plain development project: pre-feasibility study. Bor area. 3 vols.* ILACO, Arnhem, The Netherlands; Sudan.

Vol. 1: Main report. Vol. 2: Technical Annexes. Vol. 3: Bor Pilot Project.

Jonglei Executive Organ, 1975. *Outline of the proposed socio-economic survey of the Jonglei scheme*. Khartoum, Sudan.

Found in PJTC library, Khartoum.
The result of the steering committee for the socio-economic study of the effects of the Jonglei Canal Scheme's visit to the Jonglei Area in 1975. It discusses and proposes a geographical survey, a demographic study, anthropological and sociological studies, service facilities survey, cost/benefit analysis of the whole Jonglei Project, and studies of agriculture, livestock economies and local attitudes.

Jonglei Executive Organ, 1975. *Jonglei Project (Phase 1).* Khartoum, Sudan.

The report by the Executive Organ for the Development Projects in the Jonglei Area gives a general description of the project area (climate, topography, inhabitants, livestock resources etc.) and an account of the historical background of the project, the hydrology of the river system, description of the project, effects of the project, the water benefit resulting from the project, cost estimates of phase one and the economic aspects of the project. The four appendices give programme of execution works, annual discharges of the Upper Nile reaches, climatological normals at Malakal, Bor, Shambe and the regulations of the National Council for the Development Projects in the Jonglei Area.

Jonglei Office, 1975. *Site investigations for the Jonglei Canal & the related structures.* Sudan.

Found in PJTC library, Khartoum.

Yahia Abdel Mageed, 1975. *Control and Use of Nile Water in Sudan.* Ministry of Irrigation and Hydroelectric Power, June 1975, Khartoum, Sudan.

Also in Berthelot Report (1976).
Ministry of Irrigation and Hydroelectric Power, Sudan, 1975. *The Implementation of the New Rotation in the Gezira Scheme (mimeo).* Wad Medani, Sudan.

Specifies planting period and end of irrigation for each crop, maximum cropped areas, water requirements and interactions during the critical September-October period.

V. Myers and M. Abdel Hardy, 1975. *Planning for conservation of the Bahr el Jebel flood waters in Sudan and Egypt using remote sensing*. Khartoum, Sudan.

National Council for Development Projects in the Jonglei Area, 1975. *An outline of the proposed socio-economic survey of the Jonglei scheme.* Executive Organ (Development Projects in the Jonglei Area), Khartoum, Sudan.

Outlines the aims and scopes of each part of the proposed socio-economic survey of the Jonglei Canal area, viz., geographical surveys, demographic, anthropological and sociological studies, surveys on the attitudes of the inhabitants to the project, available facilities and services and livestock economics and analysis of the proposed agricultural project, as well as the methodology to be adopted in each case. Microfiche No. 21910.

National Council for Research; Agricultural Research Council, 1975. *Aquatic weed management. Some prospects for the Sudan and the Nile. Report of a Workshop held 24-29 November 1979, Khartoum, Sudan.* National Council for Research, Agricultural Research Council, Democratic Republic of the Sudan: National Academy of Sciences, United States of America., Khartoum, Sudan.

Deals with one of the environmental disasters of the century; the outbreak of water hyacinth in the Sudan (a South American plant). Before 1958 it had not been reported in the Upper Nile region. The conference summarizes the state of knowledge about the plant at the time and suggests protective measures. Conference: Workshop on Aquatic Weed Management and Utilisation, Khartoum, Sudan, 1975.

Pacific Air Survey Co. Ltd., 1975. *Quotations for the survey and mapping of the reach from Malakal to Bor and River Atem from head to mouth.* Tokyo, Japan; Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Democratic Republic of Sudan, 1975. *Control and Use of the Nile Waters in Irrigation.* Ministry of Irrigation, Khartoum, Sudan.

Abdel-Mageed Yahia, 1975. The water resources of the Nile in the Sudan. *Sudan International Publications* 1, No. 12-13: 13-15.

S.el Zein, 1975. The Water resources of the Nile for agricultural development in the Sudan. *Aquatic Weeds in the Sudan with Special Reference to Water Hyacinth*. M. Obeid. Khartoum, National Council for Research; Agricultural Research Council, Khartoum**:** 1-9.

Discusses the ingress of weeds where large bodies of clear water have been created as reservoirs or canal systems. Prepared for the Workshop on Aquatic Weed Management and Utilization, organised by the National Council for Research, Sudan, and National Academy of Sciences, USA.

Abdel-Gadir Ahmed, 1976. *Anthropology and development planning in the Sudan: The case of the Jonglei canal*. Khartoum, Sudan, National Council for Research. Economic

and Social Research Council.

Outlines briefly the geographical characteristics of the Jonglei Project area and describes the socio-economic organisation of the inhabitants, with emphasis on basic economic units of production and consumption. Includes suggestions for development strategies based on a multi-disciplinary, integrated approach, with reference to the role of anthropologists in preliminary survey, socio-economic study and implementation phases.

Bechtel International Inc. Engineers, 1976. *Proposal for Engineering Services - Jonglei Project - Hydraulic Structures.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

L. Berry, 1976. The Nile in the Sudan, geomorphological history. *The Nile, biology of an ancient river*. J. Rzoska. Netherlands, Dr. W. Junk B.V.**:** 11-19.

R.M. Berthelot, 1976. *The Control and Use of Nile Waters in the Sudan.*Sudan.

Known as the Berthelot Report, this document contains the findings of the 1976 UNDP Fact Finding Mission to the Sudan. It discusses a variety of issues, among them the proposed Jonglei Canal.

R.M. Berthelot, 1976. *Jonglei Canal.* UN, New York, USA; Sudan.

Bristol Electricity Inst., 1976. *Sudan Power Market Survey 1975-1990.* Sudan.

A summary undertaken on behalf of the Sudan government at a time when general economic optimism still prevailed.

Head Office. Compagnie de Construction Internationales, a French Societé Anonyme, 1976. *Jonglei Canal Project.*Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Consortium Comprising: Sea Consult, Coyne & Bellier and Hydronamic, 1976. *Jonglei Project - Proposals for Engineering Services.* Sudan

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

E.G. Davy, F. Mattei and S.I. Solomon, 1976. *Evaluation of climate and water resources for development of agriculture in the Sudano-Sahelian zone of West Africa.* Geneva, Switzerland; Sudan.

Euroconsult Delft Hydraulic Laboratory, Bish & Partners,, 1976. *Jonglei Structures Phase 1 Interim Report no. 1 Volume 2*.Sudan.

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Delft Hydraulics Laboratory, 1976. *Description of activities of Delft Hydraulics Laboratory concerning Jonglei Canal Project.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

I. Dunn, Ed. 1976. *Preliminary Report for a Research Program to Investigate the Hydrobiological Effects of the Proposed Jonglei Canal Scheme.* Nairobi, Kenya, UNESCO.

Drainage Works and Water Resources Egyptian Consultants Bureau for Irrigation, 1976. *Jonglei Project.*Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Engineering and Power Development Consultants Ltd. and Haskoning Consulting Engineers & Architects, 1976. *Jonglei Project, Vol 1, 2 and 3, Proposals for Engineering Services.*Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Euroconsult, Delft Hydraulics Laboratory and Bish and Partners, 1976. *Proposal for Engineering Services for Jonglei Project.* PJTC, Arnhem, The Netherlands; Sudan.

Proposal/Report.

H.G. Farbrother, 1976. *Water requirements in the Gezira & Managil*. Contribution to: UNESCO Regional Meeting, Egypt.

Also available as Technical Notes on Water-Use No. 8, GRS/FAO (mimeo).

H.G. Farbrother, 1976. *September 1976 and its problems of supply & demand in the Gezira.* GRS/FAO (mimeo),Sudan.

H.G. Farbrother, 1976. *Rice; Water requirements on Gezira Clay; - Measured*

discharges taken by Government of China Team for the Irrigation of 15 feddans of Experimental Rice in the Gezira. GRS/FAO (mimeo), Sudan.

D. Hammerton, 1976. The Blue Nile in the Plains. *The Nile, Biology of an Ancient River*. J. Rzoska. The Hague, Uunk Publishers.

Harza Engineering Company International, 1976. *Proposal for Engineering Services, Jonglei Project, Phase 1.*Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

A.M. Ibrahim, 1976. *A Request for the Funding of Development Projects in the Jonglei Area.* The Executive Organ for the Development Projects in the Jonglei Area, Khartoum, Sudan.

This report by the Technical Coordinating Committee of the Executive Organ for the Development Projects in the Jonglei Area was prepared in order to make a comprehensive and co-ordinated programme of surveys, investigations and projects. It proposes 13 studies and projects, with the aim of providing data that should 'ensure orderly change and the gradual but total transformation and modernisation of economic and social life in the region'. Details of each projects are provided in 13 appendices, encompassing among other things studies of a mathematical model of hydrological simulation of the Nile system in Sudan, wildlife survey, an aerial survey of the livestock in the region, a study of fisheries development and three integrated rural development projects.

A.M. Ibrahim and M.A. Nur, 1976. *Bahr El Jebel discharge losses as a result of the Jonglei Canal.* Permanent Joint Technical Commission for Nile Waters, Khartoum, Sudan.

Written by the Irrigation Advisor, Ministry of Irrigation and the Chief Engineer, Jonglei Office. A regression and correlation analysis is used to estimate the losses that would be caused at the tail of the swamps as a result of the Jonglei Project. The report concludes that 'no' adverse effect would result from the Jonglei Canal on the natural flows of Bahr al Jebel system' (p. 14). Found in PJTC library, Khartoum.

ILACO, 1976. *The Jonglei Pilot Scheme Study.* ILACO, Arnhem (Netherlands), Sudan.

This scheme encompassed 200,000 feddans and was situated between the River Atem and the Bor-Kongor road. The study aimed to cover both rainfed and irrigated agriculture, the improvement of traditional agriculture, the training of staff, farmers and labourers. It also aimed to gain an insight into aspects of employment and resettlement of these rural people. Includes appendices.

Jonglei Executive Organ, 1976. *A Request for Funding of Projects in the Jonglei Area.* Khartoum, Sudan.

Jonglei Executive Organ, 1976. *Regulations of the National Council for the Development Projects in Jonglei Area.* Khartoum, Sudan.

Jonglei Executive Organ, 1976. *Labour Migration in the Jonglei Area.* Khartoum, Sudan.

The report was drawn up for the Jonglei Executive Organ, and examined labour migration, especially north-south. Based on a survey of migrants coming from the Jonglei area, it asked whether a new migration pattern is developing caused by the restoration of peace in the South. Provided some details on migration statistics.

Jonglei Executive Organ, 1976. *Interim Report. (Report No. 1.).* Khartoum, Sudan.

Jonglei Socio-Economic Research Team, 1976. *An Interim Report.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Jonglei Socio-Economic Research Team, 1976. *An Interim Report.* The Democratic Republic of the Sudan. Executive Organ for the Development of the Jonglei Area, Economic and Social Research Council, National Council for Research, Khartoum, Sudan.

Description of physical and human geography of the Jonglei area of the Sudan with results of a survey on the role of cattle in socio-economic life, trade and rural markets. Proposals for future research. According to the team leader, Abdel Gaffar M. Ahmed, the objective of the report was to give an 'idea of the material collected by the socio-economic research team in its fieldwork during dry season' (mainly filling out the household questionnaire), and it is underlined that the materials presented ‘are by no means final'. The fieldwork took place from the beginning of February 1976 to the end of April 1976.

M. A. M. Elnur and I. Hassan, 1976. *A preliminary report on Shambe & Mushar El Reng River Harbour.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

O. Mann, 1976. *Transnational Environmental Implications of the Jonglei Canal Project in South Sudan.* Environment Liaison Centre, Nairobi, Kenya; Sudan.

Pacific Air Survey Co. Ltd., 1976. *Tender for the arerial survey mapping of Bahr El Jebel between Bor and Awai Mouth.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

W.J.A. Payne, 1976. *A preliminary report on the livestock industry in the Jonglei area.* United Nations Development Programme. Economic and Social research Council, Khartoum, Sudan.

This report by a senior consultant in UNDP, examines the effects of the construction of the Jonglei Canal on the existing livestock economies (flood waters, water supplies, alternative employment opportunities, the proposed irrigation scheme) and discusses possible methods of improving the productivity of existing livestock production (among Shilluk, Dinka, Nuer). Outlines survey results on the area's environmental conditions, types of livestock, animal population, husbandry systems, animal diseases and marketing. Found in PJTC library, Khartoum.

PJTC, 1976. *Monthly means and yearly max, min and totals for discharges and gauges for the main stations of the Jonglei project.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

D.A. Rijks, 1976. Water use by irrigated cotton in the Sudan. 4. Water use, potential evaporation and yield. *Journal of Applied Ecology* 13(2): 491-506.

Estimates of water used by irrigated cotton crops. The most serious limitations of the methods used were: errors in the micrometeorological estimates due to large vertical and horizontal variations; imprecision in estimates of soil water content; unrepresentative crop growth inside the lysimeter; and inaccuracies in the measurement of irrigation water applied. Waterlogging decreased crop growth. Shortage of water was most pronounced near the leading edge so that yield was smaller and was produced later at the upwind end. Modifications of irrigation practice were suggested to increase yield near the leading edge.

al-Zein Saghayroun, 1976. *Staff Summary Report of Regional Workshop on Aquatic Weed Management and Utilization in the Nile Basin.* National Council for Research, Khartoum, Sudan.

al-Zein Saghayroun, 1976. The Water Resources of the Nile for Agricultural Development in the Sudan. *Aquatic Weed in the Sudan*. M. Obeid. Khartoum, Sudan, National Council for Research and University of Khartoum.

I.G. Simpson, 1976. *The Sudan Gezira Scheme - Transformation and Evolution*. Accelerating National Agricultural and Rural Development, Reading, UK, University of Reading.

A review of the evolution of the Gezira Scheme between nationalization in 1950 and 1976.

Sir Alexander Gibb & Partners, 1976. *Jonglei Project Proposal for Engineering Services.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters

(PJTC), Khartoum.

Sir Mott MacDonald & Partners, 1976. *Proposal for Engineering Service for the Jonglei Project, Part 2 Remuneration.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Sogreah Consulting Engineers, 1976. *Jonglei Project Proposal for Engineering Services, Finacial Terms and Technical Terms.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Abdel-Bagi M.A. Subaei, 1976. *Labour migration and the Jonglei area: a report to the Commissioner for the Development Projects in the Jonglei area.* Democratic Republic of the Sudan Executive Organ for the Development Project in the Jonglei Area Economic and Social Research Council National Council for Research, Khartoum, Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

United Nations Development Programme/Fact-finding mission and R.M. Berthelot, 1976. *Jonglei Canal (SUD/GEN).* UNDP, Khartoum, Sudan.

This mission report on the Jonglei Canal was a result of a request of the Sudan government for multi-sectoral prefeasibility studies in the Jonglei Project. It proposes both socio-economic surveys and resource surveys. Contains annexes on the Jonglei Project (Phase I), a note on control and use of the Nile waters in the Sudan, prepared by the Ministry of Irrigation and Hydropower in June 1975, and an outline of the proposed socio-economic survey of the Jonglei scheme/proposed research projects for the study of the Jonglei Area and a mathematical hydrological simulation model.

D.D. Yong, 1976. *The development aspect of Jonglei scheme in the Sudan*. Khartoum, Sudan, National Council for Development Projects in the Jonglei Area. Executive Organ.

An early outline of the work programme formulated by the Jonglei Executive Organ. In addition to presenting a brief description of the concepts and aims of the Jonglei Canal scheme and some of its local effects, it lists long- and short-term study plans and data collection projects. Paper presented at the seminar on Socioeconomic Studies in Jonglei Area, Cairo, 12-15 Jan. 1977. Found in PJTC library, Khartoum.

W.B. Zimmermann and J.J. van der Zwaard, 1976. *Jonglei structures; studies, investigations and designs*.

A report commissioned by the Permanent Joint Technical Commission for Nile Waters in 1976, undertaken by a consultancy team (Euroconsult and the Delft Hydraulics Laboratory) aiming at studying

canal structures and design work related to the Jonglei Canal. Discusses navigation locks, gate-maintenance, harbour and ship guide structures, the design of the regulator etc.

Muhammad H. Abdel-Karim and et al., 1977. Exploratory Soil Survey and Land Suitability Classification of the Jonglei Project Area.*Soil Survey Administration*.

H.S. Adam and H.G. Farbrother, 1977. Crop-Water Use in Irrigated and Rainfed Agriculture in the Democratic Republic of the Sudan. *United Nations Water Conference, Mar del Plata, Argentina 1977*. New York, UN.

Survey of climatic factors, crop water use measurements, Penman methods, and calculation of water requirements for irrigated and rainfed crops.

Ahmed el-Houri Ahmed, 1977. *The silviculture and management of Eucalyptus microtheca in irrigated plantations in the Gezira of the Sudan*. Sudan, Forests Administration, Ministry of Agriculture, Food and Natural Resources.

Saad Elmedani Ahmed, 1977. *The integration of agricultural credit and marketing in the Gezira Scheme of the Sudan*. London, UK, University of London.

A.H. Ali, 1977. *Agriculture in the Sudan. Selected Bibliography with Abstracts*. Khartoum, Ministry of Agriculture, Food and Natural Resources.

Contains 1116 references to works published in 1954-1977. Covers the following subjects: cotton; oil; fats and gum arabic; crop protection; national development plans and rural plans on farming; management and land use: land reclamation: drainage and irrigation; fertilisers and other agricultural topics.

M.A. Ali and O.A.A. Fadl, 1977. Irrigation of a Saline-Sodic Site in the Sudan Gezira. II - Salt movement and Sodicity Changes. *Tropical Agriculture.* 54(3): 279-283.

Experiments in the Gezira were conducted with the aim of reclaiming land of impaired quality, since any expansion of agriculture would have to be on lands with high sodic and saline contents. The experiments involved observations of salt movement where a fruit and vegetable garden was planned. Two small plots were selected, irrigated with water from the Blue Nile, and planted with alfalfa. The results show that irrigation with Blue Nile water and cropping with alfalfa caused a net downward movement of salts.

Mohamed Kamal Ali, 1977. The Projects for the Increase of the Nile Yield with Special Reference to Jonglei Project. *UN Water Conference, Mar del Plata, Mar. 1977*. New York, Pergamon Press. Vol. 4**:** 1799-1823.

The hydrology of main rivers and tributaries in the South Sudan is described. Gives a brief account of both the Bahr al-Ghazal and the Sobat Machar basins, but concentrates on the Jonglei Canal project. Estimates water loss at 42 billion cubic metres annually. Presents projected water conservation works which include dams, diversion works, and embankments. Economic aspects of the project with respect to

Egypt, Sudan and the project area are discussed. The author has worked at the Nile Waters Department, Sudan.

T. Barnett, 1977. *The Gezira Scheme: an illusion of development*. University of East Anglia, London, UK, Frank Cass.

An alternative to Gaitskell's 'official' history and an influential interpretation of the macro-setting, structure and performance of the Gezira Scheme.

Delft Hydraulic Laboratory, Euroconsult and Bish & Partners, 1977. *Jonglei Structures Phase 1 Project Report No. 1 Draft, Short describtion of the field surveys and investigations and program of future studies.*Sudan.

Found in PJTC library, Khartoum. From catalogue: Considerations with respect to the location of the Off-take of the Jonglei Canal, The structures at the intake and the outfall of the canal. Annex B: Note on the methodology and construction costs of banking the Atem and Bahr El Jebel.

Delft Hydraulic Laboratory, Euroconsult and Bish & Partners, 1977. *Jonglei Structures Phase 1 Interim Report No. 2 Appendix 1 Hydrological Background Information for the Design of the Structures.*Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Delft Hydraulics Laboratory, 1977. *Aerial photographs of the river system in the Sudd region between Jonglei and Malakal (Sudan) 1: Film 5-7 2:Film 8-10 3: Film 14-17.*Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Delft Hydraulics Laboratory, Euroconsult and Bish & Partners, 1977. *Jonglei Project Evaluation - Phase 1.*Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Government of Egypt, 1977. Increase of the Nile yield, Jonglei Canal project. *Water Management and Development, Proceedings of the United Nations Water Conference; Mar del Plata; Argentina, March 1977.* Vol. 1, part 4, E/Conf. 70/Abstract 16**:** 1775.

An official Egyptian assessment of the benefits of the Jonglei Canal project.

Mohammed Osman el-Sammani and F.M. el-Amin, 1977. *The impact of the extension of Jonglei Canal on the area from Kongor to Bor.* Jonglei Socio-Economic Research Unit, Khartoum, Sudan.

Studies the impact of the proposed new alignment which implied further extension of the Canal from a point near Kongor down to Bor. It focuses on general land use patterns and livestock breeding, and tries to assess the size and geographical distribution of the affected population. One method employed was to map both sides of the road from Kongor to Bor in a detailed transect at one-kilometre intervals.

el-Bushra el-Sayed and Mohammed Osman el-Sammani, 1977. Urban and rural water supplies in the Sudan. *Ekistics* 43(254): 36.

Shows that the bulk of the inhabitants are concentrated along the Nile corridor. Urbanization and water resources, and drinking water for rural areas in the Sudan are discussed. Shows that piped water was not provided to all the urban population, even in towns along the Nile river. The drinking water requirement for humans and animals in rural areas in 1975 was 335 million cubic m, of which only 64 million cubic m were available. The magnitude of the rural water development problem is discussed.

B. Entz, 1977. *Sedimentation Process Above the Aswan High Dam in Lake Nasser-Nubia (Egypt-Sudan).*

Proceedings; Congress in Denmark 1977, Part 3; International Vereinigung fur Theoretische und Angewandte Limnologie, Vol 20, 1978.
Argues that if sedimentation continues undisturbed, Lake Nasser, formed by the Aswan High Dam, Egypt, would not be completely filled for 1700 years. Strong water level fluctuations and floods could markedly reduce filling time. This 1973 echo-sounding study investigated depths of new sediments. No durable deposits have been formed previously in the swift Nile River; however, as soon as the river widens, at 390 km from the dam, sedimentation starts immediately. The old river bed is completely filled with new sediments. The New Nile will flow between newly formed mud banks. The sedimentation peak is gradually moving northwards.

H.G. Farbrother, 1977. *Water Requirements of Gezira and Managil in the 1976/77 Season.* Gezira Research Station/FAO, Sudan

'Technical Notes on Water-Use' were sponsored jointly by the Gezira Research Station, ARC, and by the Food and Agriculture Organization of the United Nations, under the terms of FAO Project REM/71/293; and TCP/Sudan/6/01.

H.G. Farbrother, 1977. *Summer Water Study on Soreba Minor Canal in the Gezira.* Gezira Research Station/FAO,Sudan.

H.G. Farbrother, 1977. *Indenting and Water Management on Moharram Minor Canal.* Sudan

Food and Agriculture Organization of the United Nations, 1977. *The Sudan. Multi-Temporal Landsat Imagery Interpretation of the Flood Region Draining to the 'Sudd'.* Rome, Italy; Sudan.

GITEC Consult GMBH - Düsseldorf (DE), 1977. *Khartoum area water supply: feasibility study for the distribution network proposal, November 1977.* Düsseldorf, Germany; Sudan.

Contents: introduction; presentation of firms; existing water supply scheme; project approach and methodology; execution of the project; work programme and personnel assignment; curricula vitae; and reference projects.

Yahia Hassan Hamid and Mohamed Ali Shingiti, 1977. *Bibliography of Engineering in the Sudan*. Khartoum, Sudan, National Council for Research.

P. Hayes, 1977. *Jonglei Canal: Risking Social and Ecological Disaster.* Environment Liaison Centre, Nairobi, Kenya; Sudan.

A.M. Ibrahim, 1977. *In Defence of the Jonglei Canal Project*.

Speech given at the American University, Cairo, December 1977.

A.M. Ibrahim and M.A. Nur, 1977. *Likely Irrigated Agriculture by 2000 A.D. in the Democratic Repulic of the Sudan.* Ministry of Irrigation, Khartoum, Sudan.

ILACO, 1977. *Pengko Pilot Project; Sociological Investigations - Second Phase.* ILACO, Arnhem,The Netherlands; Sudan.

ILACO, 1977. *Pengko Pilot Project; Sociological Investigations - First Phase.* ILACO, Arnhem,The Netherlands; Sudan.

A.M. Khalifa and M.A. al-Nasry, 1977. *Improving the Water Yield of the River Nile by Minimizing the Losses in the Swamps*. United Nations Water Conference, Mar del Plata, Argentina, New York, UN.

A. Kleinschrot, 1977. Nutzung der Gewasser im Sudan. *Österreichische Wasserwirtschaft* 29: 157-164.

[Utilization of the waterways of the Sudan]
A short and general account of the Nile and Nile projects in Sudan.

M. Y. Saood, 1977. *Approach to define the suitable utilization of Bahr El Jebel.* Sudan

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters

(PJTC), Khartoum.

O. Mann, 1977. *The Jonglei Canal. Environmental and social aspects. A report for the Environment Liaison Centre.* Environment Liaison Centre, Nairobi, Kenya; Sudan.

A very critical assessment of the Jonglei Canal based on prospects of ecological degradation, discussing fisheries, water for cattle, local employment etc. Argues for example that 'although the government claims (...) that losses of pastures will only be in the order of 19%' (p.56), the partial swamp drainage could lead to a breakdown in swamp ecology as a whole, 'leading to 100% loss of these vital lands' (p.56).

Mefit-Babtie, 1977. *Detailed feasibility study for the proposed hydro-electric installation: Bedden rapids.* Khartoum, Sudan.

Argues that Bedden has the potential for hydro-electric power production with capacity to produce 20 to 75 Megawatts. If this is developed it could meet Juba's energy needs.
All these reports have Acc. No: 4105.035.48.18 (European Development Fund Project Number).

Ministry of National Planning, Sudan, 1977. *Six Year Plan: Transport and Communications Sector 1977/1983.* Khartoum, Sudan.

Sir Mott MacDonald & Partners, 1977. *Blue Nile Waters Study; Phase 1A - Availability & Use Of Blue Nile Water: Volume 1: The Main Report.*Sudan.

Found in Sir Mott MacDonald & Partners library, Cambridge.

W.J.A. Payne and F.M. el Amin, 1977. *An interim report on the Dinka livestock industry in the Jonglei Area. Report No 5.* Democratic Republic of the Sudan, Economic and Social Research Council, Khartoum, Sudan.

Aims to provide general background information and some approximate parameters on productivity of the Dinka livestock, an assessment of the effects of the construction of the canal and suggestions for the initial planning of the industry's future role. It also outlines some specific recommendations to the Jonglei project itself, among which were realignment of the canal at the southern end and trials on access across the canal. The sources include: the livestock section of the socio-economic survey conducted by the three teams of the Economic and Social Research Council during the dry season of 1976, an aerial survey of the Jonglei province in 1976, surveys and investigations conducted by the Jonglei Socio-Economic Research Unit in and around Kongor and at the Param cattle camp in the dry season of 1977, and el Sammam's survey on the impact of the Jonglei Canal on the area from Kongor to Bor. Found in PJTC library, Khartoum.

S. P. A. Mefit, 1977. *Regional Development Plan, First phase B.* Rome, Italy; Sudan.

Vol 1 Urban maps, vol 2 Socio-ethnograpic analysis, vol 3 Territorial surveys, vol 4 Geochemical survey, vol 5 Urban plans for Juba, Wau, Malakal, Rumbek, Yambio, Bor, annex Maps vol 6 Water supply and sewage for Juba town. Found in PJTC library, Khartoum.

Hunting Technical Services Sir Mott MacDonald & Partners, 1977. *Blue Nile Waters Study; Phase 1A - Availability & Use Of Blue Nile Water (Draft) - Volume 2: Supporting Report: 1) Soils & Land Classification; 2) Agriculture; 3) Agricultural Economics.*Sudan.

Found in Sir Mott MacDonald & Partners library, Cambridge.

Hunting Technical Services Sir Mott MacDonald & Partners, 1977. *Blue Nile Waters Study; Interim Memorandum.*Sudan.

Found in Sir Mott MacDonald & Partners library, Cambridge.

Sudan Gezira Board, 1977. *The Gezira scheme, past and present*. Barakat, Sudan, Information and Publication Section Sudan Gezira Board.

United Nations Development Programme, 1977. *The Sudan: Multi-Temporal Landsat-Imagery Interpretation of the Flood Region Draining to the Sudd.* FAO, Rome, Italy; Sudan.

The first Landsat-Imagery Interpretation of the Flood Region, enabling analyses of a more accurate kind than that of Garstin at the beginning of the 20th century, but by and large previous observations were confirmed.

Euroconsult, Delft Hydraulics Laboratory and Bish and Partners, 1977, 1978, 1979. *Jonglei Structures: Phase I: Interim Reports 1-3.* Sudan.

Euroconsult, Delft Hydraulics Laboratory and Bish and Partners, 1977, 1978, 1979. *Jonglei Canal Project, Phase One: Progress Reports 1-3.* Arnhem, The Netherlands; Sudan.

Abdel-Hady, Abdel-Samie and El Shazly, 1978. *Soil Resources and the Potential for Agriculture Development in the Bahr el Jebel Area Southern Sudan (Jonglei Canal Project Area).* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

H.S. Adam, 1978. Evaporation in the Sudan. *Water Development and Management: Proceedings of the United Nations Water Conference, Mar del Plata, Argentina, March 1977*. New York, Pergamon Press. Vol. 1.

Shows that the annual evaporation in the Sudan ranges from 2,800 mm in the north to 1,800 mm in the south. The maximum daily evaporation is 9mm in April in the north, while the minimum is about 4mm per day in December in the Red Sea region.

Agency for International Development, Washington, US, 1978. *Sudan: Blue Nile rural development.* Washington, DC; Sudan.

This project document gives project rationale, description of activities and outputs. The major purpose of the project was to assist in developing viable approaches to small farm and livestock development for rainfed areas in the Sudan. The project will test the technical and economic feasibility of various levels of mechanised farming, the use of improved production and the assumption that mechanisation was profitable for the small farmer.

Abdel-Ghaffar Muhammad Ahmad, 1978. *Integrated rural development, problems, and strategies: the case of the Dinka and the Nuer of the Jonglei Project area in the Sudan.* Democratic Republic of the Sudan Executive Organ for the Development Projects in the Jonglei Area, Khartoum, Sudan.

Muhammad al-Amin and Nasser Ezeat, 1978. *Jonglei Canal Water Benefit.* PJTC, Khartoum, Sudan.

This study deals with benefits derived from a planned offtake of the Jonglei Canal at Bor.

Muhammad al-Amin and Nasser Ezeat, 1978. *Jonglei Canal Water Benefit (off-take at Bor).*Sudan

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

P. Chesworth and H.G. Farbrother, 1978. *Long Furrow Irrigation Field Trials, Rahad Irrigation Project.* Sir M. MacDonald & Partners, (mimeo),Sudan.

R. Critchfield, 1978. Crocodiles, cattle, and the Jonglei Canal. *International Wildlife* 8(4): 20-25.

Argues that the Jonglei project should be postponed until the local and environmental effects are more definitely known. Asserts that less than 1% of the project's total budget was being spent on ecological research. Focuses on the ecologist's fear that the Sudd's rainfall pattern will be disrupted, that the water table will be lowered, that flood hazards will increase in the Sudd region and that wildlife will be exterminated.

Delft Hydraulics Laboratory, Euroconsult and Bish & Partners, 1978. *Jonglei Structures, phase 1, Progress report No. 2. Draft.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

P.L. Deng and S. Zanen, 1978. *Interim Report on the Eastern Realignment of the Jonglei Canal.* JEO Social and Resettlement Unit and Dutch Ministry of Foreign Affairs, Bor, Sudan.

Earthscan, 1978. *The Jonglei Canal.* Earthscan, London, UK, Sudan.

Provides brief information about the background of the canal project, the content of the project itself and some of the most debated issues, asking questions like: will the climate change? will wells dry up? how much pasture will be lost? Presents some of the most common and controversial viewpoints regarding these issues. The document was researched and written by Mike Muller.

El Shazly and Abdel-Hady, 1978. *Satellite Mapping, Regional Geology, Geomorphology, Structures, Drainage and Hydrology of Bahr el Jebel Area (Jonglei Canal Project Area) Southern Sudan.* Sudan.

Found in PJTC library, Sudan.

Mohammed Osman el-Sammani, 1978. The status of survey research for rural development in the Sudan. *The evaluation and application of survey research in the Arab world. Proceedings*. M. A. Tessler and et.al. Milwaukee, Westview Press.

A paper submitted to the Bellagio Conference, Italy, June 1983, on research methodology in social sciences surveys. The proceedings consist of 2 parts and 11 chapters by 24 scientists on how survey research can be applied. The present paper describes the data gap that limits rural development and planning. Explores how surveys can help narrow this gap by illustrating these points with a case study of the Jonglei project.

Mohammed Osman el-Sammani, 1978. *Seasonal migration of people and their animals in Kongor and Bor districts Jonglei province.* ESRC, Khartoum, Sudan.

Mohammed Osman el-Sammani, 1978. *The existing services in Kongor and Bor districts.* Democratic Republic of the Sudan, Economic and Social Research Council, JEO, Khartoum, Sudan.

Focuses on existing service facilities in Kongor and Bor districts and proposes a crash programme for improving the situation. Based on findings in the 1977-research season, it argues that due to the big, local expectations of improvements resulting from the Jonglei Canal Project, it is necessary to upgrade existing living conditions with rapid measures. The tables give detailed, quantified information on living conditions in the area.

Mohammed Osman el-Sammani, Farouk Mohamed el-Amin and P.L. Deng, 1978. *The Seasonal Migration of the People and Their Lifestock in Kongor and Bor Districts.* JEO, Khartoum, Sudan.

Mohammed Osman el-Sammani, Farouk Mohamed el-Amin and A. Hassan, 1978. *Agriculture in the Dinka and Nuer Land (Jonglei Provice).* JEO, Khartoum, Sudan.

Mohammed Osman el-Sammani and et al., 1978. *The demographic characteristics of the Dinka of Kongor community.* Democratic Republic of the Sudan, Executive Organ for the Development Projects in the Jonglei Area. Social Services and Settlement Unit, Khartoum, Sudan.

The report is based on a survey undertaken during the dry season in 1977 and focuses on the livelihood of the population, population by size of household and by age and sex, the marital status, educational attainment by age, sex and level of education, the economically active population by place, age and sex and migration. It also has a chapter on methodology and structure of the sample.

E.M. el-Shazly and M. Abdel-Hady, 1978. *Satellite mapping; regional geology, geomorphology, structure, drainage and hydrology of Bahr El Jebel area, southern Sudan (Jonglei Canal Project area)*. Cairo, Egypt, Academy of Scientific Research and Technology, Remote Sensing Centre, Cairo.

E.M. el-Shazly and et al., 1978. Jonglei Canal Project, Sudan; Landsat imagery approach. *Twelfth international symposium on remote sensing of environment, Manila, Philippines, Apr. 20-26, 1978*. 3**:** 1563-1572.

Symposium paper.

Euroconsult, 1978. *Additional Studies for the Jonglei Site.* Sudan.

Found in PJTC office, Khartoum.

Euroconsult, 1978. *Jonglei Environmental Aspects. Description of the Jonglei Area. Phase 1 Historical Background and Present Project. Impact on Water Regime and Vegetation in the Jonglei Canal. Impact on Human Life. Impact on Wildlife.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Euroconsult, 1978. *Jonglei environmental aspects.* Euroconsult, Arnhem, The Netherlands; Sudan.

Reviews the aims, plans and implementation of the building and effects of the Jonglei Canal. Discusses irrigation possibilities for northern Sudan and Egypt. A further discussion on local environmental effects of the canal on the Sudd area, covering, it is said, 8300 km^2.

H.G. Farbrother, 1978. *Water Requirements of Gezira and Managil, 1977/78 Season.* Gezira Research Station/FAO (mimeo), Sudan.

G. Heinritz, 1978. Social geographic problems in the Khasm el Girba project, Sudan. *Land Reform, Land Settlement and Cooperatives (FAO)* 2: 25-35.

This paper studies different groups living in the Khasm el Girba Project area: the resettled Nubians, the nomads, and a farm worker group from Western Sudan and West African countries who moved to the area after project completion. Argues that the Nubians reacted with an increased engagement in non-agricultural occupations, since the nomads are not prepared to confine themselves to irrigated farming and continue to keep livestock, causing some conflicts with the project management. The later immigrants play an important role in cotton production, cultivate groundnuts under sharecropping arrangements, or work for Nubian tenants.

B. van den Hoek, S. Zanen and P.L Deng, 1978. *Social-anthropological aspects of the Jonglei development projects in South Sudan (field-work report).* University of Leiden. Instituut voor Culturele Antropologie en Sociologie der Niet-Westerse Volken., Leiden, The Netherlands; Sudan.

This report by Dutch consultants for the Executive Organ for the Development Projects in the Jonglei Area describes the methodology of the research involving interviews with local government representatives and the rural population. Discusses problems of cattle migration, the social system of the fishing community and religion. A plea for the eastern alignment of the Jonglei Canal, being a direct line from Sobat to Bor, instead of the officially favoured modifications of the original line. The authors insist that their report reflects the views of the local population. A number of tables and figures on cattle migration routes are presented. Appendix 1-A. Data of Nyennyang cattle camp on herd structure. Appendix 1-B: Example of compensation for lost property of one Shilluk compound. Appendix 2. Map of the suggested alignment to the east of the settled areas between Bor and Duk Faiwil.

Hydrobiological Research Unit of the University of Khartoum, 1978. *Joint Team Report to the Commissioner on the Jonglei Development Projects on the Swamp Ecology.* Khartoum, Sudan.

ILACO, 1978. *Research Results 1977. Research Programme 1978.* ILACO, Arnhem, The Netherlands; Sudan.

The purpose of the research in 1977 was to look for suitable crop varieties and their sowing dates. The 1978 programme stresses the selection of new varieties and the further testing of the new varieties chosen in 1977. Standard measures applied are tillage, fertilizing, spacing, weed control, stubble and pest control.

International Bank for Reconstruction and Development (IBRD), 1978. *New Halfa Irrigation Rehabilitation Project: I - Agricultural Sector.* New York, USA; Sudan.

Jonglei Executive Organ, 1978. *Kongor Integrated Rural Development Project. Progress Report No. 1. February-April, 1978.* Ilaco, Arnhem, The Netherlands; Sudan.

Jonglei Executive Organ, 1978. *Kongor Integrated Rural Development Project. Draft: Evaluation of Building Materials at Bor Quay.* Ilaco, Arnhem, The NEtherlands; Sudan.

Jonglei Executive Organ, 1978. *The Existing Services in Kongor and Bor Districts.* JEO & Economic and Social Research Council, Khartoum, Sudan.

P.P.G. Keu, 1978. *The impact of the Jonglei Canal on the region*. Dept. of Political Science University of Khartoum. Khartoum, Sudan.

A short history of the Jonglei Canal; its advantages forEgypt and Northern Sudan, and advantages and disadvantages for the people of Southern Sudan who live in the Sudd. Based on secondary sources.

Delft Soil Mechanics Laboratory, 1978. *Report on Additional Soil Investigation for Jonglei Canal Structures - Sudan.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Mefit-Babtie, 1978. *Water supply and sewage disposal for Juba town.* Rome, Italy; Sudan.

Describes the various systems and processes of collecting, conveying and disposing of sewage in Juba town and their respective limitations. Also outlines three arrangements for the development of Juba. Includes designs and cost estimates. The study was part of the Regional Development study.

Mefit-Babtie, 1978. *Development studies in Jonglei Canal Region: proposal*. Rome, Italy, Mefit-Babtie.

Contents: Part one: general background; Part two: the scientific approach to the studies; Part three: approach to the ecological studies; Part four: terms of reference; Part five: management; Part six: financial proposal; and curricula vitae.

Ministry of Irrigation and Hydro-Electric Power, Sudan, 1978. *Blue Nile Waters Study. Phase IA: Availability and use of Blue Nile water.* Khartoum, Sudan.

Vol. 1:
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Vol. 2:
Supp. Report (I): Soils and Land Classification.
Supp. Report (II): Agriculture.
Supp. Report (III): Agricultural Economics.
Vol. 3:
Supp. Report (IV): Irrigation.
Vol. 4:
Supp. Report (V): Power.
Supp. Report (VI): System Planning.
Supp. Report (VII): Economic Evaluation.

Blue Nile Study Consultants -- Coyne et Bellier. Hunting Technical Services. Sir Alexander Gibb and Partners, and Sir M. MacDonald and Partners.

National Council for Development Projects in the Jonglei Area, 1978. *Jonglei environmental aspects.* Ministry of Foreign Affairs, Amsterdam, The Netherlands; Khartoum, Sudan.

Gaafar Mohammed Nimeiri, 1978. *Revision of production relationship in the Gezira and Managil Scheme in the Sudan: an extract from President Gaafar Mohammed Nimeiri's statement during his monthly televised & broadcast exposition to the nation on the evening of Monday, September 11, 1978*. Barakat Hqs., The Sudan Gezira Board Dept. of Planning and Development.

W.J.A. Payne and C. La Muniere, 1978. *Integrated Rural Development in a Dinka Area, Kongor District. Report No. 5.* JEO, Khartoum, Sudan.

The Permanent Joint Technical Commission for Nile Waters, 1978. *Soil resources and potential for agricultural development in Bahr el Jebel in southern Sudan: Jonglei Canal project area*. Cairo, Egypt, Remote Sensing Center, Academy of Scientific Research and Technology.

In cooperation with the Remote Sensing Institute, South Dakota State University, USA for Permanent Joint Technical Commission for Nile Waters. This technical commission was organised by the governments of Egypt and the Sudan, with its headquarters in Khartoum.

J.D.M. Platenkamp, 1978. *The Jonglei Canal: its impact on an integrated system in the southern Sudan.* University of Leiden, Leiden, The Netherlands; Sudan.

This work started as a literature survey in 1976, but was later extended aiming at describing the systematic relationships which determine the ecosystem of the Sudd area. The report does not offer new data. Aims at presenting the 'state of the art' regarding so diverse topics as fauna, fisheries, hydrology, climatic impact, etc.

R.B. Salama, 1978. Groundwater resources of the Sudan. *Water Development and Management; Proceedings of the United Nations Water Conference, Mar del Plata, Argentina, March 1977*. New York, USA, Pergamon Press. Part 4.

The minimum annual requirements of water for the human and animal population in the rural areas of the Sudan were estimated to be 275 million cubic metres (mcm). Groundwater basins provided 23.2% of this amount in 1977. Recharge of groundwater was estimated at 1,381 mcm annually, but only 143 mcm of this water was used. Total groundwater reserves were estimated at 41.8 bcm. Consequently, it is argued, large quantities of groundwater are available for the future development of irrigation and domestic supplies in the Sudan.

Sir Alexander Gibb & Partners, 1978. Nile Waters Study Supporting report VI Hydrology Draft.

Sir Alexander Gibb & Partners, 1978. *Blue Nile Waters Study Phase 1B Preliminary design of Dam and power projects report.* Sudan.

This reports has been scanned by Jacobs, Reading, UK, (former Sir Alexander Gibb and Partners) and can be obtained from their electronic archive. It mainly concerns the heightening of the Roseires Dam.

Sir Mott MacDonald and Partners Ltd, 1978. *Blue Nile Water Study.* Egyptian Ministry of Public Works, Cairo, Egypt; Sudan.

Sir Mott MacDonald and Partners Ltd and Hunting Technical Services Ltd, 1978. *Blue Nile waters study, phase 1C: Wad Salman Project, feasibility study, volume 1, main report.* Cambridge, UK; Sudan.

Hunting Technical Services Sir Mott MacDonald & Partners, 1978. *Blue Nile Waters Study; Preliminary Design Of Dam & Power Projects - Report Drawings Part 1 & 2.* Sudan.

Found in Sir Mott MacDonald & Partners library, Cambridge.

South Dakota University, 1978. *Remote Sensing Studies of the Jonglei Canal area.* South Dakota State University Press, Vermillion, SD. (Brookings, SD.); Sudan.

Documents the results of respective studies. An important report on the results of satellite photography of the Sudd.

Sudan. National Council for Development Project in the Jonglei Area, 1978. *Jonglei environmental aspects.* Sudan.

Focuses on the Jonglei project's impact on the water regime, vegetation in swamp, population and migration of the wildlife, effects on fisheries, and discusses the existing way of life and settlement patterns of Nuer, Dinka and Shilluk. Includes recommendations.

Sudan. Transport and Communications Section, 1978. *Six-year plan: transport & communications sector 1977-1983. - 2nd print.* Khartoum, Sudan.

Abdullai A. Tahir and Mohamed O. el-Sammani, 1978. *Environmental and Socio-Economic Impact of the Jonglei Canal Project.* Executive Organ for the Development of the Jonglei Area, Khartoum, Sudan.

The paper argues that the Bahr el Ghazal and Mashar swamps contribute to the build up of the Sudd, and that rains in the Jonglei Canal are affected by the South Atlantic Ocean and not by local conditions. The report also argues that the Sudd swamps have no effect on the Nubian sands. The authors claim, on the other hand, that the canal will reclaim the flood area, ease transport, and create employment opportunities. Found in PJTC library, Khartoum.

The Executive Organ for the Development Projects of the Jonglei Area, 1978. *Development Pilot Scheme in Jonglei Area. Terms of reference for the establishment of a rain-fed crop production & integrated rural community.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

J. Wright, 1978. Sudan holds the Nile Key. Building of the Jonglei Canal. *Geographical Magazine* 51(1): 33-42.

A popular presentation of the Nile, its history, geography, and importance for inhabitants of the Nile Valley. The Jonglei Canal is described as a great conservation and engineering scheme to prevent the loss of water in the Sudd.

Mohamed Mirghani Abdel-Salam, 1979. *The institutional development of the Sudan Gezira, with special reference to impact on tenants' performance*. Reading, UK, Department of Agricultural Economics and Management University of Reading.

A broad analysis of the economics and the institutional development of the Gezira scheme and the consequences for the tenants.

Mohamed Mirghani Abdel-Salam, 1979. *The Sudan Gezira Scheme: some institutional aspects*. Khartoum, Sudan, Economic and Social Research Council National Council for Research.

Ali Abdel-Gadir Ali and Huda Abdel Sattar, 1979. On production relations in Sudanese irrigated agriculture. *Sudan Notes and Records* 60: 15-27.

J. Briggs, 1979. The Development of irrigated agriculture in Sudan. *Journal of the Geographical Association of Tanzania* 16: 89-96.

Coyne & Bellier, Sir M. MacDonald and Partners Ltd, Hunting Technical Services Ltd and Sir Mott MacDonald and Partners, 1979. *Nile Waters Study.* Egyptian Ministry of Public Works, the Republic of the Sudan, Cairo, Egypt; and Khartoum, Sudan

The Main Report. Supporting Report I Soil and Land Classification II Agriculture and Agricultural Economies III Livestock IV Irrigation V Hydro-electric Projects VI Hydrology VlI System Model.

Delft Hydraulic Laboratory, Euroconsult and Bish & Partners, 1979. Technical and Economic Evaluation and Comparison of the Jonglei and Bor Off-take Sites.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

O.A. el-Toum and M.A. Ali, 1979. Criteria for irrigated vertisols in the Sudan. *Land evaluation criteria for irrigation*, FAO**:** 145-159.

Euroconsult, Delft Hydraulics Laboratory and Bish and Partners, 1979. *Additional Studies for the Jonglei Site.* Arnhem, The Netherlands; Sudan.

Sarwat Fahmy and Fouad El Shibini, 1979. *Upper Nile Water Resources Development Project*. Conference on Water Resources Planning in Egypt. Cairo Egypt, CairoCairo; Mass. USA, Massachussetts Institute of Technology; Khartoum, Sudan, Ministry of Irrigation.

H.G. Farbrother, 1979. *Water Management in the Gezira.* Food and Agriculture Organization of the United Nations, Rome, Italy; Sudan.

Summary statement of water management finding and recommendations based on work of previous decade. Focuses on improved yields through more stable supply to heads of minor canals. Terminal Statement of Project TCP/Sudan/6/01.

Food and Agriculture Organization of the United Nations, 1979. *Water Management in the Gezira; Terminal Statement prepared for the Government of the Sudan, by the Food and Agriculture Organisation of the United Nations.* Sudan.

J.J. Gaudet, 1979. Management of papyrus swamps. *Berichte aus dem Fachgebiet Herbologie der Universität Hohenheim* 18; Vol 1: Proceedings of a symposium: 85-93.

Argues that the ability of the papyrus in the upper reaches of the Nile to absorb nutrients and trace elements could be useful for sewage or waste water treatment. Such schemes would involve the cropping of papyrus.

Hayder Ibrahim, 1979. *The shaiqiya: The cultural and social change of a northern Sudanese riverain people*. Wiesbaden, Germany, Franz Steiner.

Hassan Ali Ibrahim, Abmed El Shinawi and Sohair Sood. Zaghloul, 1979. *Regulation of*

the Equatorial Lakes and Phase Two of the Jonglei Canal Project. Conference on Water Resources Planning in Egypt. Mass, USA, Massachussetts Institute of Technology; Egyptian Ministry of Irrigation, Cairo, Egypt, Cairo University.

ILACO, 1979. *Soils of Pengko and Eastern Plains.* ILACO, Arnhem (Netherlands), Sudan

This soil survey was part of the Kongor Integrated Rural Development Project. Two soil surveys conducted in Bor and Pengko areas showed the surface horizons to be clayey and sandy in content. Generally, the soils are non-saline and the top soil acidic.

ILACO, 1979. *The Social and Economic Setting of Rural Bor Dinka. Pengko Pilot Project, vol. 1.* ILACO, Arnhem, The Netherlands; Sudan.

Describes and analyses the historical, social and economic setting of the Bor area based on field work done in 1979 in Bor Gok. Presents main features of 'production factors'; land, labour and capital and role of cattle and pastoralism. Recommendations for further research aiming at rural development. Also notes on Dinka system of thought, labour division, education, population growth, ownership of land and water and migration. Appendices on policy declaration on rural development from 'The six year plan, 1977-1983.' and animal production.

International Bank for Reconstruction and Development (IBRD), 1979. *Sudan Agricultural Sector Survey.* Washington, D.C.,Sudan.

Jonglei Executive Organ, 1979. *Technical assistance contract for swamps ecology survey: proposed work plan.* Khartoum, Sudan.

Jonglei Executive Organ, 1979. *Proposals for a Mid-term Program and a Crash Program for Development of Agriculture, Livestock and Socio-Economic Services in the Jonglei Canal Area.* Khartoum, Sudan.

A report drawing up programmes in line with the aim of the project; to 'draw the local people into modern economic enterprises, to serve the two objectives of producing adequate food to meet its own needs and raise a surplus that enter the cash circle'. Tables give detailed information about the condition of services in Bor, Kongor, Ayod and Fam Ez Zeraf Local Government Councils, and also cost estimates of production of various agricultural products.

Jonglei Executive Organ, 1979. *Kongor Integrated Rural Development Project. Draft Project Plan.* Ilaco, Arnhem, The Netherlands; Sudan.

Jonglei Executive Organ, 1979. *Investigations of the General Ecology of the Sudd Area.* University of Khartoum - Hydrobiological Research Unit, Khartoum, Sudan.

A report led by a research team under team leader Dr. A.I. El Moghraby, presented to JEO. It aims to present an overview of the ecology of the Sudd area, underlining that it was not a continuation of the Jonglei Investigation Team of the 1950s. The scope of the 'present studies is both wider and deeper'. This report is based on three excursions; in December 1976 and January 1977, 22 localities on the White Nile and its tributaries were sampled; in the first half of April Malakal-Bentiu and Malakal-Juba were surveyed. Among other findings, 50 different species of mosquitos were reported in the Sudd Region.

Jonglei Executive Organ, 1979. *Comparative Socio-Economic Benefits of the Eastern Alignment and the Direct Jonglei Canal Line.* Khartoum, Sudan.

A socio-economic assessment of the two alignments; the Direct Line (running from Jonglei Village on the Atem River to River Sobat mouth) and the Eastern alignment (takes off just north of Bor town in a north eastern direction, and then runs northwards to the east of the settled zone of Bor Athooc and Twic Dinka, to join the established direct line at a point north of Duk Fadiet (about 160 km. from the Sobat mouth). Presents basic data on the impact of the two alignments.

M. Jurriens and G.J. Klaassen, 1979. *Evaluation of the Possibilities and the Effects of Bypassing Water along Marshy Areas*. Proceedings of the Congress of the International Association for Hydraulic Research.

Their findings are of relevance to the Jonglei Canal Project.

A. Mackie, 1979. Jonglei Canal may be a unifying force for Sudan. *Middle East Economic Digest* 23(17): 6.

Supports the Jonglei Canal project as a navigation project, as a link between North and South, and as a promoter of development.

Mecasol, 1979. *CCI - Alternative Solution for the Jonglei Project No 1.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Mefit-Babtie, 1979. *Technical assistance contract for swamp ecology survey: proposed work plan.* Khartoum, Sudan.

Contains terms of reference for carrying out scientific and allied studies in the Jonglei Canal area. These terms include studies on the eco-system, fisheries, soil-water interaction hydrologic regime and the production of maps.

Mefit-Babtie, 1979. *Technical assistance contract for range ecology survey, livestock investigations and water supply. Water supply: an addendum to inception report.* Mefit-Babtie, Khartoum, Sudan.

Contents: Part 1: introduction; Part 2: preliminary investigations; Part 3: form, nature and extent of water supply investigations; Part 4: the work programme; Part 5: purchase of equipment.

Ministry of Irrigation, Sudan, 1979. *Nile Waters Study.* Khartoum, Sudan.

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Supp. Report (I): Soils and Land Classification.
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Supp. Report (III): Livestock.
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Supp. Report (IV): Irrigation.
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Supp. Report (VI): Hydrology.
Supp. Report (VII): System Models.
Consultants -- Coyne et Belia. Sir Alexander Gibb and Partners, Hunting Technical Services, Ltd., and Sir M. MacDonald and Partners

Ministry of National Planning, Sudan, Transport and Communication Section, 1979. *River transport investment policy study*. Khartoum, Sudan.

The study focuses mainly on the freight transport demand and supply situation in river transport. It makes projections for the likely traffic level at the end of Nimeiri's six-year plan. The Kosti-Juba link is analysed and discussed. Fifteen statistical appendices.

National Council for the Development of Jonglei Canal Area. Executive Organ, 1979. *Proposals for a mid-term programme and a crash programme for the development of agriculture, livestock, and socio-economic services in the Jonglei Canal Area.* National Council for the Development of Jonglei Canal Area, Khartoum, Sudan.

W.J.A. Payne, 1979. *Economic and Social Aspects of the Various Alignment Proposals for The Jonglei Canal*. Khartoum, Sudan, UNDP.

Fahmy Sarwat and el Shibini Fouad, 1979. *Upper Nile Water Resources Development Projects*. Conference on Water Resources Planning in Egypt, Cairo, Egypt, Cairo University; Mass, USA, Massachussetts Institute of Technology; Egyptian Ministry of Irrigation.

Sir M. MacDonald and Partners Ltd, 1979. *Nile Waters Study.* Egyptian Ministry of Public Works, the Republic of the Sudan, Cairo, Egypt; Khartoum, Sudan.

Sir Mott MacDonald and Partners Ltd and Hunting Technical Services Ltd, 1979. *Reappraisal of the Northern and Nile Provinces pump schemes. Part II, volume 1, main report.* Cambridge, UK; Sudan.

Sir Mott MacDonald and Partners Ltd and Hunting Technical Services Ltd, 1979. *Reappraisal of the Northern and Nile Provinces pump schemes. Part I, volume 2, supporting reports.* Cambridge, UK; Sudan.

Sir Mott MacDonald and Partners Ltd and Hunting Technical Services Ltd, 1979. *Blue Nile waters study, phase 1C. Wad Salman Project, feasibility study. Volume II, supporting reports.* Cambridge, UK; Sudan.

One of the reports produced by the firm established by Murdock MacDonald, the Adviser to the Ministry of Public Works from 1911 to 1920, when he was forced to resign after intervention from London and the British High Commissioner in Egypt, Lord Allenby.

Sir Mott MacDonald and Partners Ltd and Hunting Technical Services Ltd, 1979. *Blue Nile waters study, phase 1C. Shasheina Project (Wad Salman, Shasheina & Suki pump schemes group): feasibility study report, draft.* Cambridge, UK; Sudan.

Democratic Republic of Sudan, 1979. *Nile Waters Study.* Ministry of Irrigation, Khartoum, Sudan.

Sudan. Southern Region, 1979. *Rural water supply study Upper Nile Province.* Herts, UK, Ensercon, Sudan.

Subjects dealt with include topographic surveys, soil investigation and analysis. Also provides information on sociology, water and soils.

Taha el-Jack Taha, 1979. *The Managil southwestern extension to the Gezira scheme in the Democratic Republic of Sudan: a major irrigation scheme*. Cairo, Egypt, the American University in Cairo Press. (OCoLC)5787326.

Places Managil in the historical context of irrigation development in the Sudan and reviews production performance through the 1975-76 season.

el-Sayed Ali Ahmed Zaki, 1979. *An on-going evaluation of the planning, implementation and tenancy (farm) size of the Rahad irrigation project of the Sudan*. Mich, USA, Michigan State University.

M.E. Beshir and A.I. El-Moghraby, 1980. Ecological Studies on the Sudanese Nile System. *Water Supply and Management* 4(1/2): 25-8.

Ecological studies on the Sudanese Nile River system up to 1980 are reviewed, beginning with the works of mid-eighteenth century explorers and including the works of H.E. Hurst and others.

G. Bos, 1980. *Activities in relation to water in Jonglei area. Report on a short term consultancy to FAO.* Delft Hydraulics/Euroconsult, Arnhem, The Netherlands; Sudan.

This two-week consultancy report to FAO suggests further study of the mathematical model of the Nile system as developed by Euroconsult. It also points to the coordination problems among different agencies in the Jonglei area. It presents a list of activities in relation to water in the area.

D. Boyles, 1980. The biggest ditch. *Geo* 2(2): 8-28.

Discusses many of the most widely debated problems relating to the Jonglei project, as well as its role in regional politics. Includes photographs.

S.-O. Chan and P.S. Eagleson, 1980. *Water balance studies of the Bahr El Ghazal swamp.* Dept. of Civil Engineering, Massachusetts Institute of Technology, Cambridge, Mass; Sudan.

Delft Hydraulics Laboratory, Euroconsult and Bish & Partners, 1980. *Jonglei Structures phase 1, Note on alternative design without off-take structures. Consequences for the canal discharges.* Sudan.

Found in the PJTC library, Khartoum

Delft Hydraulics Laboratory, Euroconsult and Dutch State Public Works, 1980. *Draft Proposal for Engineering Services for Authority for Jonglei Canal and Adjacent Rivers.* Sudan

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

I.I. el-Hemry and P.S. Eagleson, 1980. *Water balance estimates of the Machar Marshes.* Dept. of Engineering, School of Engineering, Massachusetts Institute of Technology., Cambridge, Mass., Sudan.

The general water balance of the Machar region is studied, using models which try to incorporate the dynamic interaction of climate, soil and vegetation. Probabilistic estimates of annual water yield of the Machar catchments are presented. Concludes that more than 8 billion cubic metres can be contributed annually from the Machar region to the White Nile by executing the channel system proposed by the Sudan government.

Mohammed Osman el-Sammani, 1980. *Dynamics of planned change in the Twic area*. Khartoum, Sudan, Khartoum University.

Presents results of studies on the livestock economy, especially its main features and the economic and social role of cattle; of agriculture; of economic life in terms of incomes and expenditures; and existing social services among the Twic Dinka. Recommends policy guidelines to improve development in the area.

Euroconsult, Delft Hydraulic Laboratory and Bish & Partners, 1980. *Jonglei Structures Phase 1 Progress report No 4 Draft.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Euroconsult, Sir Alexander Gibb & Partners and Technical Consultation Serv., 1980. *Gezira rehabilitation and modernization project 1: proposal for consultants' services.* Arnhem, The Netherlands; Sudan.

Contains the following: project overview, approach to work and curricula vitae of consultants.

Europe Outremer, 1980. The earth begins to live: irrigation transforms 170 000 hectares of arid steppe into fertile land. The Kenana sugar factory. (Et la terre se mit a vivre: l'irrigation transforme 170 000 hectares de steppe aride en terre fertile. La sucrerie Kenana.). *Europe Outremer* 609: 35-8.

Two articles examine the Kenana projects (Abou Naama and Rahad) on the Blue Nile. The agro-industrial complex at Kenana was designed to serve a 37 000 ha sugarcane plantation and to achieve an annual production of more than 300 000 tonnes of white sugar. Details of the refinery, of financing of the project (primarily by France and Japan) and of equipment are provided.

H. Faki, 1980. *The Economics of Water Management in the Sudan Gezira Scheme*. Stuttgart, Germany, University of Hohenheim.

Analysis of major management and socio-economic issues arising from Gezira intensification and diversification and the joint-account system. Presents estimates of costs and returns to irrigation and proposes a water rates system. Evaluates alternative cropping systems subject to different patterns of water distribution, water rates, and capacity expansion. Taken from Baily op. cit.

Food and Agriculture Organization of the United Nations, 1980. *Integrated rural development in Kongor district: water development component.* FAO, Rome, Italy,Sudan.

Reports on the overall objective of this project: the smooth transformation and modernization of the way of life of the Dinka of the Kongor area. Suggests that this can be done by building dykes and bunds to control the flood waters, providing water supplies in the dry season and studying the effects of the Jonglei Canal on the area.

K.H. Gorey, 1980. *Land Development Project, the Sudan. The Aweil Rice Scheme, 1974-1979.* FAO, Rome, Italy; Sudan.

As a part of the Land Development Project in the Southern Sudan being undertaken by the Government of the Sudan with assistance from the Food and Agriculture Organization of the United Nations Development Programme, work was carried out to reactivate and redesign the Aweil Rice Scheme. The project found that a gravity irrigation and drainage scheme was feasible on the Aweil flood plain, covering 10 000 ha, and that a joint scheme/tenant farmer system was viable. One hectare per tenant

farmer was regarded as the optimal plot size, and 3.5 t/ha the average yield obtainable. It was recommended that the initial area of full water development should be 600 ha, and that the Wageningen system of full water control be used. The cultivation practices recommended were dry seeding, rain germination emergence and plant establishment, with chemical weed control followed by irrigation. It was found that additional milling and storage facilities were needed, as was the development of a rice marketing system. FAO proposed that the studies for engineering and hydrological services necessary for a larger scheme be subcontracted, and a description of the work required is appended to the report.

Hydraulic Research Station, 1980. *Erosion along the River Nile, Report no. EX913.* Wallingford, UK; Sudan.

Jonglei Executive Organ, 1980. *Works Related to the Jonglei Canal not included in CCI's contract. Jonglei Canal Project: Eastern Alignment to Bor.* Compagnie de Constructions Internationales and Compagnie Francaise D'Enterprises, Paris, France; Khartoum, Sudan.

Jonglei Executive Organ, 1980. *Report on meeting for coordination of Jonglei Executive Organ: work plan, 1981.* Khartoum, Sudan.

This was the first meeting that marked the execution of the development programme in Jonglei area. Topics discussed cover the Nile yield, project infrastructure, socio-economic development, fisheries and range ecology, and food distribution.

Jonglei Executive Organ, 1980. *Jonglei Canal: A Development Project in the Sudan.* JEO, Khartoum, Sudan.

A public defence of the Jonglei Project, as planned in 1979.

Jonglei Executive Organ, 1980. *Jonglei Canal Project, Phase I and II: Water Cost Study.* Egyptian Ministry of Irrigation, Cairo, Egypt; Sudan.

Jonglei Executive Organ, 1980. *Capital outlay forecast. Jonglei Canal Project: Eastern Alignment to Bor.* Compagnie de Constructiones Internationales and Compagnie Francaise D'Enterprises, Khartoum, Sudan; Paris, France.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Jonglei Executive Organ, 1980. *Agreements Supplementary to and amending certain provisions of the contract agreement signed the 28th day of July, 1976.* Ministry of Irrigation, Government of the Democratic Republic of the Sudan and Compagnie de Constructiones Internationales and Compagnie Francaise D'Enterprises, Khartoum and Paris,Sudan.

Contract for digging the Jonglei Canal, Western Alignment, in 1980, almost 80 years after Gerstin first published the idea.

K.B.E. Karunaratne and Food and Agriculture Organization of the United Nations, 1980. *The irrigated seed production farms at Hudeiba and Dongola.* FAO, Rome, Italy; Sudan.

M. Manohar and A.M. Adam, 1980. *Preliminary report about erosion between Merowe-Hereimah stretch of Nile River.* Ministry of Irrigation, Wad Medani (Sudan). Hydraulic Research Station, Sudan.

Microfiche No. 21675.

Mefit-Babtie, 1980. *Technical assistance contract for range ecology survey, livestock investigations and water supply: first interim report, volume two.* Mefit-Babtie, Rome, Italy; Sudan.

Mefit-Babtie, 1980. *Technical assistance contract for range ecology survey, livestock investigations and water supply: first interim report, volume 1.* Mefit-Babtie, Khartoum, Sudan.

Contains: Aerial census; vegetation mapping; range ecology; livestock and veterinary survey; mapping and water supply. Appendices. 2 vols.

Mefit-Babtie, 1980. *Development Studies in the Jonglei Canal Area. Technical Assistance Contract for Range Ecology Survey, Livestock Investigations and Water Supply. Interim Report No.1.* Mefit Babtie, Glasgow, Khartoum & Rome,Sudan

Mefit-Babtie, 1980. *Development studies in Jonglei Canal Area: confidential project report.* Rome, Italy; Sudan.

Provides summary of the project, financial breakdown of the project, and critical study of major problems encountered during the execution of the project.

Ministry of Irrigation, Egyptian Government, 1980. *Jonglei Canal Project, Phase I and II: Water Cost Study.* Cairo, Egypt; Sudan.

Ministry of National Planning and Transport, Democratic Republic of Sudan, 1980. *River transport. Investment policy study.* Ministry of National Planning and Ministry of Transport, River Transport Corporation, Khartoum, Sudan.

Focuses on economic characteristics of river transport operations in relation to other transport methods,

and tries to identify the role of public and private investment spheres on a national level. Regarding the Kosti-Juba link it presents information on existing fleet, transported tonnage and passenger traffic during the 1970s.

E. Montasser, 1980. *The Nile waters and agricultural expansion in Egypt and Sudan; an economic evaluation of the Jonglei Canal*. Nasr City, Cairo (Egypt), Arab Republic of Egypt, Institute of National Planning.

Originally a report commissioned by the Permanent Joint Technical Committee for Nile Waters and completed in 1978. The study is divided into three parts; a) physiography and other physical aspects of the project; b) assesses the project's regional effects; while c) attempts to provide quantitative estimates of the project's cost benefits and returns. It concludes that the project's internal rate of return, mainly from its water yield, could be in the range of 30 per cent or more.

National Council for the Development of the Jonglei Canal Area, Ex. Organ, 1980. *A Development Project in the Sudan. Jonglei Canal*. Khartoum, Sudan Government.

A short official description of the Jonglei Canal Project is presented and its significance for the environment, population and the development of the Sudan is briefly explained. The pamphlet contains both a French (pp. 42- 68) and an English version (pp. 6-33).

Research Institute for Water Resources Development and Economics, 1980. *Jonglei Canal Project, Water Cost Study.* Cairo, Egypt; Sudan.

M.K. Salih, 1980. *The geological and hydrogeological evaluation of the White Nile province using resistivity method*. University of Khartoum.National Water Administration, Khartoum, Sudan.

T. Scudder, 1980. River-basin development and local initiative in African savanna environments. *Human ecology in savanna environments*. D. R. Harris, Academic Press**:** 383-405.

Discusses the importance of riverine and lacustrine habitats for savanna populations and the socio-economic rationality and dynamism of local systems of land and water use related to the inland delta of the Niger, to middle Zambezi, and also to the Sudd region of the Upper Nile. A scenario for dam construction regarded as beneficial to local populations is presented by way of extended summary.

Sir Alexander Gibb and Partners, 1980. *Reservoir Power Station report on Blockage of Intake Screens: Flood Season, 1980.* Sir Alexander Gibb and Partners, London, UK; Sudan.

Sir Mott MacDonald and Partners Ltd, 1980. *Review of integrated land and water resource development.* Cambridge, UK; Sudan.

People, land, water, forests and wildlife are the resources of the Southern Sudan. These resources can contribute to the expansion and diversification of agriculture in the region.

Sir M. MacDonald and Partners Ltd, Hunting Technical Services Ltd and Ministry of Irrigation, Sudan, 1980. *Blue Nile waters study, phase 1C: Shasheina project (Wad Salman, Shasheina & Suki Pump Schemes Group) : feasibility study report.* Govt. of the Democratic Republic of the Sudan Ministry of Irrigation, Khartoum Sudan.

This is one of the many reports produced on Nile works by this British firm, originally established by the former Irrigation Adviser to the Egyptian Government until November 1921, Sir Murdoch MacDonald. It is based in Cambridge, UK.

J.E. Stephenson, 1980. *Nile River irrigation system redesign, rehabilitation and improvement program*. [S.l., s.n.] United States. Agency for International Development.

Abdullai A. Tahir, 1980. The Sudd as a Wetland Ecosystem and the Jonglei Canal Project. *Water Supply and Management* 4(1/2): 53-55.

Written by a member of the Jonglei Executive Organ, this article is a defence against criticism regarding environmental changes in the Sudd ecosystem as a consequence of the Jonglei Canal. Argues briefly that the expected reduction of present Sudd swamp area (1980) will not exceed 10%, that draining the swamps would have no general effect on rainfall over the Sudan as a whole and that there is clear indication that 'there is no effect on depletion of ground water to the North if the swamps are drained'.

Abdullai A. Tahir and Mohammed O. el-Sammani, 1980. Environmental and Socioeconomic Impact of Jonglei Canal Project. *Water Supply and Management* 4(1-2): 45-51.

A listing and presentation of the different research programmes that were going on in the late 1970s about the socio-economic impact of the Jonglei project locally.

World Bank, 1980. *New Halfa irrigation rehabilitation project - Sudan.* Sudan.

The proposed project planned over a five-year period to rehabilitate the New Halfa Irrigation scheme by providing it with the means for rapid increase and sustaining of agricultural production through efficient use of available land, water and human resources. Specifically, the project was to include agricultural machinery, workshop facilities and fuel storage, road-making and canal maintenance equipment.

World Bank, 1980. *Public Electricity and Water Corporation (third power) project - Sudan.*Sudan.

The proposed project was designed to help meet Sudan's power requirement up to the end of 1986. The project included the following elements: (a) addition of the fifth and sixth hydro-units (80 MW) at the existing Roseires Hydroelectric facility plus embedded parts of unit seven; (b) reinforcement of the 33 kV transmission circuits between Burri and Khartoum North substation; (c) extension to Khartoum North substation; (d) engineering and site supervision; (e) management and staff training; (f) stringing of the second 220-kV transmission circuit between Sennar junction and the Kilo X substation in Khartoum; (g)

installation of about 40 MW diesel generating capacity of Burri power station; (h) installation of the first and second units (2 x 30 MW) at the Khartoum North steam power plant.

World Bank; IBRD, 1980. *Impact Evaluation Report: Sudan Roseires Irrigation Project.* IBRD, Washington D.C.; Sudan.

O.A.A. Ageeb and F.M. Khalifa, 1981. *Irrigated soybean production in the Sudan*. Int Agric. Pupls. Wad Medani, Gezira Research Station**:** 173-8.

Associated Consultants, 1981. *Small-Scale Abstraction of Water From Jonglei Canal.* JEO, Khartoum, Sudan.

Project Report. Including separate volume of drawings.

Mahdi Bashir, 1981. *The Jonglei Canal*. Univ. of Khartoum. Khartoum, Sudan.

Beller Consult Gmbh. (DE) and Sir M. MacDonald and Partners (GB), 1981. *Master plan and feasibility study for sewerage and stormwater drainage Wad Medani: offer for consultancy services financial proposal.* Freiburg, Germany; Sudan.

Berenschot-Moret-Bosboom (BMB), Tilburg (Netherlands), 1981. *Proposal for the study of river transport in the Sudan*. Tilburg, The Netherlands.

Contents: consultant's reference form, contracts of a similar nature performed by the consultant, technical proposal, experience records of proposed experts, cost proposal, draft consultancy contract. A report in collaboration with Commission of European Communities and Ministry of National Planning, Khartoum.

Bertlin and Partners, Redhill (GB) and Uniconsult, Hamburg (DE), 1981. *River transport study (master plan): proposal for consultancy services, technical proposal*. Redhill, UK.

This proposal starts with an introduction, general appraisal and comments on terms of reference, then goes on to the methodology, work programme, and project team to be used for the study.

J. Callede, 1981. *Hydrology Study of the Kongor Area.* ORSTOM, Paris, France; Sudan.

This is a report to the Government of the Democratic Republic of Sudan and UNDP.

Delft Hydraulics Laboratory, Euroconsult and Bish & Partners, 1981. *Jonglei Structures, phase 1. Note on Alternative Design without off-take structures.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters

(PJTC), Khartoum.

S.B. Dhar, 1981. *Long-range electricity futures for Sudan; two scenarios, 1982-2000.* United States Agency for International Development, Washington, D.C., Sudan.

Prepared for the US Agency for International Development (USAID) by the International Science and Technology Institute, Inc. and Energy Development International, Inc., this study examines two scenarios regarding future electricity policy in the Sudan: one labelled the 'conventional outlook', which does not require a redirection of long-established trends of electric energy utilization and development process; the other, labelled 'Alternative Resources' maximizes reliance on hydro-electric sources and reduces oil-fired generation significantly. It was argued that in 1990, 74% of national energy use would still derive from thermal generation, if no new hydro-electric resources were developed in the meantime. The resource examined for expedited development was the lower Meroe site.

Asim Ibrahim el-Moghraby, 1981. *The Jonglei Canal*, Khartoum, Sudan, Institute of African and Asian Studies; University of Khartoum.

Argues that the existence of the sudd area does not affect the rains in Southern Sudan (it is caused by the South Atlantic Ocean). Waters of Bahr al Jebel have high chemical quality, but passing through the sudd, it loses this to the plants of the sudd. The sudd area has lots of crocodiles, hippos, insects, fishes, birds and other animal and plant life. The author accepts the argument that the canal will disrupt environmental and socio-economic life, but argues that the benefits in reduction of floods, growth in tourism and a general improvement of the life of the Nilotic people and irrigation development are more attractive. Also appears in The Nile Valley Countries: Continuity and Change./ed. by M.O. Beshir; Khartoum, 1984, pp. 31-42.

Mohammed Osman el-Sammani, 1981. *Socio-economic research and the approach to change in Jonglei area*, Khartoum, Sudan.

Argues that the Dinka, Nuer and the Shilluk should be "involved in" the socio-economic research and change which was to be carried out in the Jonglei Canal area. Argues that this is expensive in terms of money, staff and time but is important. It has also been published in The Nile Valley countries: Continuity and change/ed. by Mohamed Omer Besher; Khartoum,1984. pp.72-80

Euroconsult, Delft Hydraulics Laboratory and Bish & Partners, 1981. *Note on Filling and Emptying of the Lock Chamber of the Head Lock of the Canal M1449-IV.*Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Euroconsult, Delft Hydraulics Laboratory and Bish & Partners, 1981. *Jonglei Structures, Draft, Contract Documents.*Sudan.

Found in PJTC library, Kharotum

Euroconsult, Delft Hydraulics Laboratory and Bish and Partners, 1981. *Kongor Flood Protection Survey.* Arnhem, The Netherlands; Sudan.

Euroconsult, Delft Hydraulics Laboratory and Bish and Partners, 1981. *Jonglei Structures. Phase One: Progress Report No. 4. Vols. 1-2.* Arnhem, The Netherlands; Sudan.

H. Faki, 1981. Effect of irrigation water management on farmers' incomes in the Gezira. *Quarterly Journal of International Agriculture* 20(4): 345-59.

This article analyses regional differences and distances of farms along tertiary canals and how these factors have affected yields and incomes in Gezira.

S.M. Farah, 1981. Response of rice yields to irrigation and drainage at two phases of growth. *Journal of Agricultural Science* 96(2): 489-492.

S.M. Farah, 1981. Irrigation of kenaf (Hibiscus cannabinus L.) in Sudan. *Journal of Agricultural Science* 96(3): 569-78.

A. Fenwick, A.K. Cheesmond and M.A. Amin, 1981. Role of field irrigation canals in transmission of Schistosoma mansoni in the Gezira Scheme.*Bulletin of the World Health Organization* 59(5): 777-86.

Food and Agriculture Organization of the United Nations, 1981. *Technical Assistance Contract for Swamp Ecology. Jonglei Canal Project. Comments and Recommendations.* Rome, Italy; Sudan, FAO

Written by F. Henderson. At the request of the Jonglei Executive Organ etc., the FAO arranged for the consultant, Dr. F. Henderson, to visit the Sudan in Feb. 1981 to review a proposed Swamp Ecology Survey. The report lists equipment requirements, firms up the elements of the work plan and defines the components of longer term studies in the same programme. Mefite-Baptie, Glasgow/Rome is to undertake the study.

Food and Agriculture Organization of the United Nations, 1981. *Kongor Flood Protection Surveys. Draft Final Report.* Euroconsult, Arnhem, The Netherlands; Sudan.

Draft Final Report prepared for UN/FAO.
A report prepared by Euroconsult for FAO, supporting the canal alignment as agreed in the 'Kongor agreement' on February 2 1981. Includes annexes on Jonglei hydrology.

J. de M. Garang, 1981. *Identifying, Selecting, and Implementing Rural Development Strategies for Socio-Economic Development in the Jonglei Projects Area, Southern Region, Sudan*. Iowa State University.

This PhD thesis in agricultural economics was written by the man who some years later became the

leader of SPLA/SPLM, John Garang. Argues that the first and fundamental issue of socio-economic development in the Jonglei Area is the identification and selection of an appropriate rural development strategy. The second fundamental issue is institutionalization of the requisite agrarian structure and institutions. Within the analytical framework of a 'means-ends continuum' linear programming models are developed and applied. The author argues that the 'improvement approach' will end up managing poverty and misery, and recommends as an alternative the 'transformation approach', such as the planned Jonglei Irrigation project and Penykou Plain Development project. The book does not object to the Jonglei Canal as such but proposes larger-scale schemes (such as the Gezira) as compensation to the local people.

P. Garman, 1981. The development of a turbine for tapping river current energy (Moving water, Southern Sudan). *Appropriate Technology*. London, UK, Intermediate Technology Publications**:** 10-13.

Hafslund Consulting Division, 1981. *Eastern Equatoria Hydro-electric Power Study: Feasibility Study.* Oslo, Norway; Sudan.

Project analysis of a planned hydro-power plant at Fola Rapids in the Southern Sudan, financed and supported by the Norwegian government through the Norwegian Church Aid/Sudan Programme and the Regional Government in Juba. Appendices.

A.M. Ibrahim, 1981. *The environmental impact of the Jonglei Canal Project in the Sudan.* Khartoum, Sudan, Institute of African and Asian Studies; University of Khartoum.

A description of the canal project by one of its defenders, the head of the Projects Implementation Division AAAID, and formerly Commissioner of the Executive Organ for the Development Projects in the Jonglei Area. Argues that the design of the canal scheme as drawn up in the early 1980s would not affect the sudd owing to the reduction in its capacity. By diverting only 20 million m3/day no detrimental effects would be felt locally. On the contrary, the project hoped to improve the way of life of the Nilotics through the construction of roads, improved cattle breeding, fishing and other modern innovations. Also published in The Nile Valley countries: continuity and change./ed. M.O. Beshir; Khartoum, 1984. pp.18-30.

A.M. Ibrahim, 1981. *Development of the Nile River system.* Khartoum, Sudan.

Written by the former Irrigation Adviser, Ministry of Irrigation, Sudan and Chief, Water Resources Unit, ECA, who, by the time of writing this report, was head of the Implementation Division, AAAID. Deals mainly with Nile allocation problems and prospects and potential for river basin cooperation.

A.M. Ibrahim and M.A. Nur, 1981. *Increase of Nile Yield by Utilization of Lost Waters in Machar Marshes and Lost Waters in Ghazal Swamps*. Khartoum, Sudan, PJTC.

ILACO, 1981. *Pengko Plain Development Study: Vol. 1 - Evaluation and Conclusions; Vol.2 - Technical Annexes.* ILACO, Arnhem, The Netherlands; Sudan.

ILACO, 1981. *Bor Dinka: Prospects for Development. Pengko Pilot Project, Vol. 2.* ILACO, Arnhem, The Netherlands; Sudan.

Builds on the PPP report 1979, and sums up studies from the area since then, aiming at improving traditional agriculture and livestock-keeping and investigates other factors that influence rural development, such as employment, migration etc. A number of interventions in the socio-economics of the area are proposed, both long-term and short-term, to reverse the adverse trends in rural Bor Dinka areas.

ILACO, 1981. *Annual Report 1980.* ILACO, Arnhem, The Netherlands; Sudan.

Summarizes the main activities of Pengko Pilot Project in 1980. The project's rainfed rice trials failed due to the dry season. Also reports on the irrigation and drainage work and the socio-economic setting of the rural Bor.

ILACO, 1981. *Agricultural Research under High and Low Input Levels, Wet Season, 1980.* ILACO, Arnhem, The Netherlands; Sudan.

International Bank for Reconstruction and Development (IBRD), 1981. *Economic Memorandum of Ethiopia.* Washington, D.C.

International Science and Technology Institute, 1981. *Recommendations for the short-range (1981-1986) reliability improvement programs, Public Electricity and Water Corporation, Khartoum, Sudan.* Energy/Development International. United States. Agency for International Development, Washington, D.C.; Sudan.

Technical paper. Prepared for US agency for International Development (USAID) by International Science and Technology Institute, Inc. and Energy Development International, Inc.

Jonglei Executive Organ, 1981. *Progress Report: April 1, 1979, to August 31, 1981.* Khartoum, Sudan.

Jonglei Office, 1981. *A note on the Jonglei discharge site at Atem, Memoir No 1.*Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

Jonglei Office, 1981. *Increase of the Nile Yield by Utilization of lost water in Manchar Marshes Region.*Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

V.G. Krishnamurthy, 1981. The impact foreseen of the Jonglei Canal Scheme on the fisheries of the Sudd Region: The problems and solutions. *Seminar on River Basin Management and Development, Blantyre, Malawi, 8-10 December 1980. Papers presented*. J. M. Kapetsky. Rome, Italy, FAO, Fisheries Department**:** 105-120.

Puts forward the view that the construction of the Jonglei Canal would create detrimental changes. Proposals include the construction of ponds, fish farms, and training the local people to collect fish fry and transport them to reservoirs.

G.T. Lako, 1981. *Social differentiation and the market; the case of Kongor in the Jonglei Canal area*. Norwich, UK , School of Development Studies, University of East Anglia.

The study examines ongoing trends in socio-economic differentiation among the Dinka, looking at them through the market structure and the possible processes of transformation associated with the Jonglei Canal Project. Data were collected during a short visit (January to May 1977) and through guided interviews and observation. By taking as its theoretical starting point the assumption that the crucial point is that between change evolved from within and change imposed from without, it argues that the project will have 'no clear positive influence on the alleviation of poverty, but would rather tend to intensify income inequalities, increase social differentiation and most likely lead to deeper class contradiction' (p. 53).

Mefit-Babtie, 1981. *Technical assistance contract for range ecology survey, livestock investigations and water supply: second interim report.* Mefit-Babtie, Rome, Italy; Sudan.

Consists of five parts: introduction; livestock and veterinary research; botanical and rangeland productivity research, appendices to part three; water supply; range ecology.

Ministry of Irrigation and Hydroelectric Power, Sudan, 1981. *Roseires reservoir survey: Blue Nile: topography and bathymetry operations*. Massy, France, Compaignie Generale de Geophysique.

National Council for Development of the Jonglei Area. Executive Organ, 1981. *Small-Scale Abstraction of Water from Jonglei Canal.* Associated Consultants, Khartoum, Sudan.

The Permanent Joint Technical Commission for Nile Waters, 1981. *The Jonglei Canal Project. An Economic Evaluation.* Khartoum, Sudan.

The official plan for the Jonglei Canal project as proposed and justified by PJTC in 1981. Found in PJTC library.

The Permanent Joint Technical Commission for Nile Waters, 1981. *Interregional Meeting of International River Organisations.* Dakar, Senegal, Sudan.

The Permanent Joint Technical Commission for Nile Waters, 1981. *Increase of Nile Yield by Utilization of Lost Waters in Machar Marshes and Lost Waters in Ghazal Swamps.* Khartoum., Sudan.

An official plan for increasing the Nile yield to the north, including the Machar Marshes and the swamps of Bahr al-Ghazal.

The Permanent Joint Technical Commission for Nile Waters and Netherlands Ministry of Foreign Affairs, 1981. *Jonglei Structures Phase One Progress Report.* Khartoum, Sudan.

N. Pollard, 1981. The Gezira scheme - a study in failure. *Ecologist* 11(1): 21-31.

Rendel, Palmer & Tritton, 1981. *Consulting services for a study of river transport in the Sudan: proposal*. London, UK.

Contains details of the approach proposed for the study, together with curricula vitae and an account of previous projects undertaken by this firm.

M. Salem-Murdoch, 1981. *Arabs and Nubians in New Halfa: A study of settlement and irrigation*. Salt Lake City, USA, University of Utah Press.

Abdin M. A. Salih, 1981. Reclamation of water from Bahr el Jebel swamps. *Water International* 6(2): 71-74.

Reviews and comments briefly on some of the proposals for reclaiming the waters of the swamp area put forth between the 1930s and 1979. Argues that changes in proposed schemes have resulted from successive survey findings. Based on new findings the latest study indicated that canal headworks should be moved southward and that banking of Bahr al-Jabal should be an important part of the scheme. Paper presented also at the IWRA III World Congress on Water Resources, Mexico City, April 1979.

Sir Alexander Gibb and Partners, 1981. *Feasibility study for water supply to Wau: draft final report, volume 1, main report, short term water development scheme.* Khartoum, Sudan.

Part one of the report gives information relating to the project, its costs and viability. Part two gives background information on the town of Wau, existing water supply facilities, sanitation, forecasts for water demand, water resources, and design criteria. Part three deals with long term requirements and proposals, giving a development programme and recommendations. Part four discusses short term water development scheme including refurbishing existing works, new works proposals, management and organization, cost estimates, implementation, financial aspects and analysis, and further investigations. Collaborated with Project Preparation Unit, Ministry of National Planning, Sudan.

Sir Alexander Gibb and Partners, 1981. *Feasibility study for water supply to Malakal: preliminary report, volume 11, appendices.* Khartoum, Sudan.

This volume is divided into 10 sections: 1) Project definition and summary; 2) Background information; 3) Existing water supply facilities; 4) Forecasts for water demand; 5) Management and finance; 6) Sanitation; 7) Water resources; 8) Design criteria; 9) Preliminary proposals for new works; 10) Immediate measures.
Collaborated with Project Preparation Unit, Ministry of National Planning, Sudan.

Sir Alexander Gibb and Partners, 1981. *Feasibility study for water supply to Damazin: preliminary report, volume 11, appendices.* Khartoum, Sudan.

Contains appendices A-E: A) Terms of reference. B) Chemical analysis of water. C) Inventory of mechanical/electrical plant. D) Water demand forecasts. E) Water resources.

Sir Alexander Gibb and Partners (Africa); Khartoum, 1981. *Feasibility study for water supply to Malakal: draft final report, volume 11, drawings.* Khartoum, Sudan.

Collaborator: Sudan. Project Preparation Unit, Ministry of National Planning.

Merghani Tag-el-Seed, 1981. *Would the Jonglei Canal be invaded by aquatic weeds?* Presented at the Fourth international Conference on the Nile Valley Countries - 'Continuity and Change'.

In this brief paper, it is suggested that the canal 'will probably be invaded by aquatic weeds' (p. 3) and measures are suggested to prevent this.

World Bank, 1981. *White Nile pump schemes rehabilitation project - Sudan.*Sudan.

The proposed project aimed over five years to help rehabilitate some 174 pump schemes on both banks of the White Nile south of Khartoum, where cotton, sorghum, groundnuts and wheat were grown. The project should improve levels of productivity of crops, expand cotton exports, raise incomes for tenants and help place the schemes on a sounder financial footing. According to estimates, it should contribute Lsd 371 million to Sudan's public revenues over the project life and benefit directly some 28,000 tenant families. The project would accomplish these objectives by providing agricultural machinery, equipment and spare parts; workshops and fuel storage facilities; motor vehicles and a telecommunications network; rehabilitation of pump-sets, pump- houses and irrigation distribution systems; incremental annual farm inputs; offices, stores and staff housing; measures to help strengthen management, administration and training; studies for further development of the White Nile area and preparation of a follow-up project.

World Bank, 1981. *Blue Nile pump schemes rehabilitation project - Sudan.* Sudan.

The project aimed over a five year period to facilitate the rehabilitation of the Shasheina Region and provide agricultural machinery and workshops for cotton cultivation in the rest of the project area. The project, situated on both sides of the Blue Nile river from about 30 km upstream of Singa to Sennar, would cover 52,500 feddans and about 50,000 feddans respectively inside and outside the Shasheina Region. Levels of productivity, particularly for cotton (in both regions), sorghum, groundnuts and vegetables, should be improved, and fodder crop for livestock (in Shasheina only) introduced.

Jonglei Executive Organ, 1981-84. *Reports on Annual Meetings for Co-ordination of Work Plans.* Khartoum, Sudan.

These reports were supported by working papers submitted by various agencies to each meeting. Copies of these are held by The Library, University of Durham.

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A.G.T. Babiker, 1982. Chemical weed control in irrigated direct-seeded rice in the Sudan Gezira. *Weed Research* 22(2): 117-121.

G.K. Bassa, 1982. Conservation and management of fisheries of the Sudd. *The Sudan: the Sudd fisheries: potential and prospects: report of the seminar in Juba, the Sudan, 24-28 November 1981*. United Nations Development Programme/Food and Agricultural Organization of the United Nations. Rome, Italy, FAO.

Seminar paper. Calls for the establishment of both long term and short term research programmes for the Sudd region. The only research carried out took place in 1964, 1977 and 1978 and was in each case only short term. As a closing remark, it asks for the introduction of government controls to protect both the local fishermen and the local fish.

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M.O. el-Khidir, 1982. *Analytical study of the Rahad scheme: a case study of a development project in the Sudan*. Univ. of Khartoum. Khartoum, Sudan.

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H.A. el-Obeid, 1982. *Water supply, policy controls and economic value of irrigation water in the Gezira Scheme*. Fort Collins, USA, Colorado State University.

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Vol. 1
Vol. 2
Annex A: The Gezira Scheme: Background, Physical Conditions and Resources.
Annex B: Agriculture (Agro-Economics).
Vol. 3
Annex C: Markets. Marketing Structure, and Prices.
Annex D: The Tenant and Agricultural Labour.
Vol. 4
Annex E: Irrigation and Drainage (Field Water Management).
Annex F: Cotton Ginning Facilities.
Vol. 5
Annex G: Infrastructure.

Annex H: Housing, Utilities and Health.
Annex I: Workshops and Maintenance Facilities.
Vol. 6
Annex J: Organization and Management.
Annex K: Pilot Farm and Schemes.
Annex L: Further Studies.
Annex M: Project Costs, Benefits, and Evaluation List of References.
Vol. 7
Annex N: Management Information System.

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Chapter 1 identifies the major management systems of the Sudan Gezira Board (SGB) and their major components. It also describes the important management information requirements, evaluates the present information system, identifies constraints for each system, and presents a general evaluation. Chapter 2 presents the recommended solution to the management information requirements of the SGB, the information systems recommended for computerization, and constraints in implementing the computerized systems. Chapter 3 presents the findings and conclusions regarding the computer suppliers in Sudan and Egypt. Chapter 4 describes the overall approach for the computerization project. Chapter 5 presents the proposed implementation plan for the computerization project. Chapter 6 presents recommended management guides for the organizational units that must be established to implement the MIS project.
Collaborator: Sir Alexander Gibb and Partners. Technical Consultation Services. (From: SSA).

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Report on experiments initiated on 4 selected vegetables during the dry season, when the plots were subjected to supplemental irrigation. Results indicated that tomatoes, okra, carrot and lettuce produced reasonably early season fruit yields and that smallholder farmers could produce vegetables early in the season.

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A.M. Kamal, 1982. *The Design and Construction of the Jonglei Project*, London.

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M.M. Khogali, 1982. Problem of siltation in Kashm El Girba reservoir: its implication and suggested solutions. *Probl. Mgmt. Irrig. land areas of traditional and Mod. cultivation*. H. Mensching. University of Khartoum. Hamburg, Germany, Gesamtherstellung: Krause-Druck Stade**:** 96-104.

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W. Koch and F. Bischof, 1982. Weed problems in irrigation schemes in Sudan. *Problems in agricultural development in Sudan*. G. Heinritz. Göttingen, Germany, Edition Herodot**:** 5-22.

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D. Leather and D.P. Shaw, 1982. Half-built canal still cause for dispute. *The Geographical Magazine* 54(12): 662.

Yahia Abdel Mageed, 1982. *Conservation Projects of the Nile and Irrigation Development in the Sudan*. Paper presented to the Royal Geographical Society Conference on the Impact of the Jonglei Canal in the Sudan, London.

K. Marshall, 1982. *Evaluation of current turbines in Southern Sudan.* I.T.I., Rugby, UK; Sudan.

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Mefit-Babtie, 1982. *Technical assistance contract for swamp ecology survey: interim report.* Mefit-Babtie, Rome, Italy, Sudan.

H.I. Mohamed, 1982. *Hydraulics of long furrow irrigation with reference to Rahad irrigation porject*. Univ. of Khartoum, Khartoum, Sudan.

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S. Shalash, 1982. *Water losses in Sobat Basin, report no. 71.* Sudan.

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Seminar paper.

Sudanese National Energy Administration, 1982. *Sudan national energy assessment.* National Energy Administration, Ministry of Energy and Mining, Khartoum, Sudan.

ME & M/USAID Energy Policy & Planning Project, International Science & Technology Institute, Inc. Energy/Development International.

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Outlines the hydrology of the Sudd Region based on measurements over the period 1905-80. The period of seasonal rainfall is found to correspond with the increase in river inflows, since the latter are 'caused by rainfall in the catchments of the seasonal torrents above Mongalla'. The relationship between inflow and outflow is analysed statistically. Also assesses the effects of different canal regimes on the size of the swamp.

Omer Ibrahim Yagi, 1982. *Investigation of the Blue Nile silt deposited in the Gereif locality, Khartoum Province*, Khartoum, Sudan, Building and Road Research Institute, University of Khartoum.

RRI - GOPA - L & P., 1982, 1983. *Study of river transport in the Sudan (misc. reports).* Sudan.

This project (No. 4505.043.48.49) was funded by the European Development Fund, and issued a large number of reports on river transport in 1982 and 1983.

O.el-B. Ali, 1983. *Reduced agricultural productivity in irrigated areas with particular*

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T. Barnett, 1983. *The Gezira scheme: Black box or Pandora's box*. Norwich, UK, School of Development Studies, University of East Anglia.

G.K. Bassa, 1983. Fish pond culturing farming in Western Equatoria Province - Prospectus. *Proceedings of the second conference on research for agricultural development in the Southern Region. 5-8 April 1982*. Juba, Regional Agricultural Research Technical Committee, Juba**:** 16-21.

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A. J. Bowyer, 1983. *Female status in the developing world, with particular reference to the Gezira Scheme, Central Sudan*. Wad Medani, Sudan, FERD University of Gezira.

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A brief presentation of the controversy over the effects of the Jonglei Canal. Argues that, on the positive side, it will result in enhanced navigation, better water supply, and new opportunities to extend health services and education to remote peoples. Adverse consequences include the disruption of village lifestyles and a potential increase in the incidence of schistosomiasis. It states wrongly that the plan for the canal was 50 years old, and the article was published at about the same time as the Sudan People's Liberation Army kidnapped eight workers of the French company that were digging the canal, thus effectively bringing the project to an end.

L.A. Desougi, 1983. *Blue Nile river from the Ethiopian border to Khartoum*. Khartoum, Sudan, Institute of Environmental Studies.

M.H.S. Ebrahim, 1983. Irrigation projects in Sudan; the promise and the reality. *Journal of African Studies* 10(1): 2-13.

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A preliminary examination of the feasibility for extending kilometre markers cum NAV-Aids from Lake No to Juba as part of a programme to improve river transport.

Mohammed Osman el-Sammani, 1983. Pressure on water resources in rural area. *Reassessment of natural resource issues in Sudan*. Khartoum, Sudan, Institute of Environmental Studies, University of Khartoum**:** 47-80.

Energy Sector Management Assistance Programme (ESMAP), 1983. *Report. Issues and Options in the Energy Sector.*Sudan.

R. Eshman, 1983. The Jonglei Canal: A Ditch Too Big. *Environment* 25(5): 15-20.

In addition to familiar arguments related to the benefits and local repercussions of the Jonglei Canal, it reports on a mathematical study which has been made of the Nile hydrology. The Sudd's water table is replenished through the absorption of water overspilling the river banks of the Nile in flood season. Reducing the amount of this overspill would affect the water table, possibly lowering it to such a degree as to affect the lives and environment of people far removed from the canal area itself.

S.M. Farah, 1983. Effects of supplementary irrigation on rain-grown sorghum (Sorghum bicolor) in Sudan. *Journal of Agricultural Science* 100(2): 323-7.

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A.M. Gasm-el-Seed, 1983. *The emergency and continuity of off tenancy activity. A case study from the Rahad Agricultural Scheme*. University of Khartoum. Khartoum, Sudan.

Hafslund Consulting Division, 1983. *Democratic Republic of the Sudan. Kinyeti Hydro Power Scheme. Feasibility Study 1981.* Oslo, Norway; Sudan.

Assesses hydroelectric power potential in the Kinyeti River and the local power demand. Discusses the most attractive project sites, describes the project and its suggested implementation, outlines transmission lines etc. The 43 appendices include among other subjects local rainfall, river discharge from 1951 to 1981 and a number of drawings of the proposed Kinyeti Hydroelectric Power Scheme. Total capacity of 'Stage A includes 3 units of I MW each and a firm power production of 12,2, GW/year'(p.2). Kenyeti ends in the swampy area south-west of Bor.

A.M. Hassan, 1983. *The causes and effects of debris accumulation at the Roseires hydro-electric dam. An Initial Survey.*Sudan

P.P. Howell, 1983. The impact of the Jonglei Canal in the Sudan. *Geographical Journal* 149(3): 286-300.

An account of the conference held at the Royal Geographical Society in London, 5 October 1982, on the development and potential effects of the Jonglei Canal. Aspects covered included planning, problems of irrigation, the canal's construction and its probable impact on local population, the land and wild life. See also the book based on the same conference proceedings.

R.M. Hussein, 1983. *The impact of the Rahad Scheme on distribution of income, expenditure and savings of the tenant farmers*. University of Khartoum. Khartoum, Sudan.

M.H.S. Ibrahim, 1983. Irrigation Projects in the Sudan: The Promise and the Reality. *Journal of African Studies* 10(1): 2-13.

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This is the report on the Fourth Meeting for Coordination of Jonglei Executive Organ Work Plans for the year 1984. The meeting was held at Bor.

Jonglei Executive Organ, 1983. *Development Studies in the Jonglei Canal Area. Technical Assistance Contract for Range Ecology Survey, Livestock Investigations and Water Supply. Final Report. Volume 4.* Ministry of Finance and Economic Planning. Executive Organ of the National Council for Development of the Jonglei Canal Area. Mefit-Babtie., Khartoum, Sudan.

A report prepared by the Executive Organ and the Mefit Babtie consultancy firm. It deals with distribution and numbers of livestock, livestock management and productivity, animal health and disease. It contains almost 200 tables on these subjects, as well as appendices dealing with cattle breeds in and around Jonglei Area, seasonal distribution of births; losses due to death and as part of marriage settlements; and monthly population composition of the Dinka cattle study group.

Jonglei Executive Organ, 1983. *Development studies in the Jonglei canal area: introduction, summary, conclusions.* JEO, Khartoum, Sudan.

G.T. Lako, 1983. *The impact of the Jonglei Canal Project on the development of the Southern Sudan and on the lives of the Dinka people*. Manchester, UK, University of Manchester.

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Volumes:
1: Summary
2: Background
3: Vegetation studies
4: Livestock
5: Wildlife
6: Water supply studies
7: Interactions within the Jonglei System, vol
8: Effects of the Canal
9: Recommendations
10: Maps

Found in PJTC library, Khartoum.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Confidential project report.* Rome, Italy; Sudan.

Provides a summary of the project, a financial breakdown, and critical study of major problems encountered during the execution of the project.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Technical assistance contract for swamp ecology survey. Final report, volume 2. Limnological and plant studies.* Mefit-Babtie, Khartoum, Sudan.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area: Technical assistance contract for range ecology survey, livestock investigations and water supply. Final report, volume 2. Background.* Mefit-Babtie, Khartoum, Sudan.

Provides a general background to the studies which were based on a temporary research camp at Nyany in Kongor district, spanning a 2.5 year period between January 1980 and June 1982. Includes descriptions of climate, hydrology, soils and the human population of the Jonglei area.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area: Technical assistance contract for swamp ecology survey. Final report, volume 1. Introduction,*

summary and conclusions. Mefit-Babtie, Khartoum, Sudan.

Provides the objectives and the background information of all the studies, the details of which are contained in the successive volumes. See register for Mefit-Babtie.

Mefit-Babtie, 1983. *Technical assistance contract for range ecology survey, livestock investigations and water supply. Draft final report, volume 7: Interactions within the Jonglei system, a discussion.* Mefit-Babtie, Khartoum, Sudan.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area: Technical assistance contract for range ecology survey, livestock investigations and water supply. Final report, volume 5. Wildlife studies.* Mefit-Babtie, Khartoum, Sudan.

Discusses the large herbivores in Jonglei ecology and their distribution, habitat selection and migration, as well as animal statistics regarding population estimates, births and deaths. Reports on wildlife diseases and their role as disease transmitters, assesses the role of wildlife as a source for human consumption. Chapter 3 presents a list of Jonglei mammals. Chapter 4 deals with birds. It provides notes on the Jonglei bird fauna. Chapter 5 deals with snakes, other reptiles and amphibia, and chapter 6 deals with termites of the Jonglei area.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Technical assistance contract for swamp ecology survey. Final report, volume 4. Fisheries socio-economic and technical studies.* Mefit-Babtie, Khartoum, Sudan.

Gives an account of fisheries of the Sudd; fishing populations and their activities; fisheries institutions and support agencies; technical aspects (fishing craft and methods, the catch, handling and processing). Economic aspects (marketing); and economics of the commercial fisheries.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Technical assistance contract for swamp ecology survey. Final report, volume 3. Invertebrate and fish studies.* Mefit-Babtie, Khartoum, Sudan.

Recognized and investigated two main groups of invertebrate animals: crustacean and rotiferan ZOOPLANKTON, and the macro-invertebrates, mostly crustaceans, insects and molluscs, which make up the ZOOBENTHOS. The fish survey identified 67 species. The report lists name of identified invertebrates and fish species.

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Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Technical assistance contract for range ecology survey, livestock investigations and water supply. Final report, volume 9: Recommendations.* Mefit-Babtie, Khartoum, Sudan

The subjects investigated included grassland productivity, vegetation distribution, mapping, livestock

productivity and disease, wild life resources, their seasonal distribution and interaction with livestock (including animal health and range management), rural water development, wildlife conservation and planning. Establishes development priorities, institutional relationships and responsibilities, programme structure, time scale for the project, financing etc. Proposes to support the Jonglei Executive Organ so that they can fulfil their planning function.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Technical assistance contract for range ecology survey, livestock investigations and water supply. Final report, volume 8. Effects of the canal.* Mefit-Babtie, Khartoum, Sudan.

This is the final report establishing 'the adverse effects ...(if any)... of the canal and what steps should therefore be taken to ameliorate these effects'. Describes potential effects on water, vegetation, livestock and wildlife.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Technical assistance contract for range ecology survey, livestock investigations and water supply. Final report, volume 7. Interactions within the Jonglei system.* Mefit-Babtie, Khartoum, Sudan.

Analyses the different types of data collected in all disciplines of the study and discusses them both from the point of view of how each influences the others and also compared to four other flood plains in Africa; two in Zambia and one each in Mali and Tanzania. The other volumes of this study are included in this bibliography, indexed under Mefit-Babtie.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Technical assistance contract for range ecology survey, livestock investigations and water supply. Final report, volume 6. Water supply studies.* Mefit-Babtie, Khartoum, Sudan.

Contains an assessment of the current water resources and water supply situation in the area, along with an analysis of the criteria and systems appropriate to future development.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Technical assistance contract for range ecology survey, livestock investigations and water supply. Final report, volume 4. Livestock studies.* Mefit-Babtie Srl., Glasgow, UK; Sudan.

This volume presents the distribution and number of livestock; livestock management and productivity; special Nuer, Dinka and Shilluk cattle studies; sheep and goats; livestock marketing and findings related to animal health and diseases.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Technical assistance contract for range ecology survey, livestock investigations and water supply. Final report, volume 3. Vegetation studies.* Mefit-Babtie, Khartoum, Sudan.

Maps the vegetation and describes the environmental factors controlling its distribution; identifies and lists all the major plants occurring in the area, and investigates the productivity of the grasslands and changes in their nutritive value.

Mefit-Babtie, 1983. *Development studies in the Jonglei Canal area. Technical assistance contract for range ecology survey, livestock investigations and water supply. Final report.* Mefit Babtie, Glasgow, UK; Khartoum, Sudan; Rome, Italy.

Ministry for National Planning, Sudan. Executive Organ of the National Council for Development of the Jonglei Canal Area, 1983. *Technical assistance contract for range ecology survey, livestock investigation and water supply. Vol. 4. Livestock studies - draft final report.* Executive Organ of the National Council for Development of the Jonglei Canal Area,Sudan.

Reports on a census of cattle, sheep and goats in the Jonglei Canal area, their pattern of distribution seasonally and regionally, their productivity, as well as livestock management and migration practices of the Dinka, Nuer and Shilluk.

Ministry of Agriculture and Irrigation (Irrigation Sector), Sudan, 1983. *Gezira Canal Regulation Handbook - Revised and Updated (typescript draft).* Sudan.

No major changes from the 1934 version (written by MacGregor) of a similar handbook.

Hassan A. Musnad, 1983. *The causes and effects of debris accumulation at the Roseires hydro-electric dam; an initial survey.* Khartoum.

Focuses on the problem of debris accumulation at the hydro-electric turbine intakes at the Roseires dam, which, especially during the high flood period, considerably reduces power output. Underlines that the causes of this process are what the author calls 'improper land use and lack of land management along the Roseires Reservoir Watershed Basin within 50 kilometres of the dam'. The study was made in April 1982.

MA Mustafa, 1983. *Community integration in the Rahad Scheme: an explanatory model*. University of Khartoum. Khartoum, Sudan.

National Energy Administration, 1983. *Sudan national energy assessment: base year (1980) energy supply/ demand balances and demand projection methodology, annex 1*. Khartoum, Sudan.

Contains a detailed account of information on production and consumption of energy at national and regional levels, an account used as the basis for projecting energy demand for 1980-90. It describes the overall supply/demand balance for the entire country for 1980. Also sections for each consumption sector.

G. Poulsen, 1983. *Community forestry in the Jonglei Canal area: a programme for action.* FAO, Rome, Italy; Sudan.

Project: Assistance in Forestry Planning. SUD/2209.

Sir Alexander Gibb and Partners, 1983. *Power IV project feasibility study: summary*

and conclusions. National Electricity Corporation, Khartoum, Sudan.

Sudan Government, 1983. The climate of the study area. *Development studies in the Jonglei Canal area. Final Report. Vol. 2. 'Background'*. Khartoum, Sudan, Ministry of Finance and Economic Planning**:** 14-30.

This presents detailed information on the climatic statistics of the Jonglei area in southern Sudan: temperature, humidity, sunshine, solar radiation, wind, evaporation and rainfall. It is information rather than analysis, prepared under the auspices of the Jonglei Development Council.

C.H. Swan, 1983. *Relations Between Management, Government and Tenants in Water Distribution Activities in the Gezira in the Sudan*. Paper presented at Conference on Development Agricole et Participation Paysanne: Les Politiques de l'eau en Afrique. Paris, France, Centre d'Etudes Jurisdiques Comparatives, Université de Paris.

J. Tait, 1983. The Modernization of the Colonial Mode of Production in the Gezira Scheme. *The Development Perspectives of the Democratic Republic of Sudan*. P. Oesterdiekhoff and K. Wohlmuth. Munich, Germany, Weltforum Verlag**:** 81-135.

A Marxist-inspired class analysis of the economic modes of production within the Gezira Scheme.

A. Trilsbach, 1983. Hydrology and water supply in the White Nile Province of the Sudan: modifications and problems. *Swansea Geographer* 20: 58-65.

Presents a case study of aspects of hydrology and water, and documents sources of water in the study area.

T. Tvedt, 1983. Konflikten i Sudan og kampen om vannet fra Nilen. *Forum for Utviklingsstudier* 10.

An early analysis of the second civil war in the Sudan, where the uneven regional development of the country is analysed in a Nile perspective.

D. Whittington, 1983. Nile water for whom? Speculations on the exchange of land and water between Egypt and Sudan. *Sudan Environment* 3(2): 1-5.

A brief review of arrangements for exchange of land and water between Egypt and Sudan for agricultural expansion.

World Bank, 1983. *Northern region agricultural rehabilitation project - Sudan (IFAD project).*Sudan.

The objectives of this project were to raise productivity and income of small farmers and cooperatives, increase food production and thereby substitutes for imports. These objectives would be achieved through the provision of (i) incremental farm inputs such as seeds, sacks, fertilizers, and hand tools; (ii) funds to

repair, rehabilitate, and replace pump-sets as required by farmers and cooperatives; (iii) tractors, including spare parts, knapsack sprayers and farm implements; and (iv) the provision of buildings, vehicles, operating costs and technical assistance to the Agricultural Bank of Sudan. The project would also provide for the repair of pumping stations in the Northern province to ensure adequate water supply to the irrigated areas.

World Bank and United Nations Development Programme, 1983. *Sudan: issues and options in the energy sector.* Washington, DC; Sudan.

D.D. Yong, 1983. Planning for the development in the Jonglei Canal area. *Development potentials of the Southern Region, proceedings*. Juba, Sudan.

A discussion of alternative development projects in the Jonglei Canal area. According to the author, the most prominent Southern member of the Jonglei Executive Organ, it was urgent to plan and implement various socio-economic projects in the area, and not only the canal itself.

Jonglei Executive Organ, 1983, 1982?? *A Comprehensive Plan for the Development of Community Services in the Jonglei Canal Area, the Sudan.* Khartoum, Sudan.

Draft 0136 S.

Hassan A. Abdel-Ati, 1984. *Lower River Atbara Area (Nile Province)*. Khartoum, Sudan, University of Khartoum.

A.I. Abdel-Rahman, 1984. *Population, environment and agricultural changes: the example of the Rahad scheme*. Development Studies and Research Centre Seminar, 42nd, Khartoum, Sudan, Faculty of Economic and Social Studies, University of Khartoum.

A seminar paper that aims to summarize some of the main socio-economic aspects of the Rahad scheme.

Yassin Abdel-Salam and D.C. Almond, 1984. The chemical characteristics of water from the Blue and White Niles. *The Nile Valley Countries: continuity and change*. M. O. Beshir. Khartoum, Sudan. Vol. 2**:** 42-58.

K.M. Abdu, 1984. An Engineer's View of Night Storage and Continuous Flow. *Water distribution in Sudanese irrigated agriculture: Productivity and Equity. Conference papers*. O. A. Fadl and C. R. Bailey. Wad Medani, Sudan, University of Gezira.

The article, written by an engineer, seeks to explain the origins and design of, and experience with, the night storage system of the Gezira scheme.

K.M. Abdu, O.A. Fadl and H.S. Adam, 1984. Analytical study of irrigation water use in

the Gezira Scheme during 1983/84 season. *Water distribution in Sudanese irrigated agriculture: Productivity and Equity. Conference papers*. O. A. Fadl and C. R. Bailey. Wad Medani, Sudan, University of Gezira**:** 94-101.

Shows that planting times were delayed or prolonged for most crops in comparison with plans, which had implications for water requirements and canal capacities.

Abu Obieda Babiker Ahmed, 1984. *Calibration of Head Regulator Km 77 across Gezira Main Canal.* Hydraulic Research Station, Wad Medani, Sudan.

S. al-Azharia and E.O. el-Fadil, 1984. Water quality fluctuations in the Blue and White Nile and the green-belt irrigation canal south of Khartoum. *Water Quality B.* 9(3): 149-55.

Seasonal fluctuations in physicochemical and bacteriological water quality parameters were documented over a one-year period in the White and Blue branches, as well as in the green-belt irrigation canal south of Khartoum. Trends in turbidity, conductivity, ph, and coliform counts were related to land uses, rainfall patterns, and sandstorm occurrences.

M.E.T. Ali, 1984. Fishes and fisheries of Lake Nubia, Sudan. *Hydrobiologia* 110: 305-314.

C.R. Bailey, 1984. A management tool for the Gezira irrigation system. *Water distribution in Sudanese irrigated agriculture: Productivity and Equity. Conference papers*. O. A. Fadl and C. R. Bailey. Wad Medani, Sudan, University of Gezira**:** 58-69.

This chapter discusses irrigation management and suggests a methodology for monitoring Gezira irrigation system performance.

R.G. Bailey and S.M. Cobb, 1984. A note on some investigations carried out in the area of the Sudan Plain to be affected by the Jonglei Canal. *Hydrobiologia* 110(4): 45-46.

Four investigations of the environmental effects of the scheme were carried out - three concerned a range ecology survey and investigations of livestock and water supplies, while the fourth was concerned specifically with the aquatic ecology of the swamps. Also in Dumont, El-Moghraby and Desougi (eds.) 1984.

Mohamed Omer Beshir, Ed. 1984. *The Nile Valley countries, continuity and change*. Sudanese library series; no. 12. Khartoum, Sudan, Institute of African and Asian Studies, University of Khartoum.

H. Dickinson and K.F. Wedgewood, 1984. The Nile waters: the Sudan's critical resource. *The Nile Valley countries: continuity and change*. M. O. Beshir. Khartoum,

Sudan, Univ. of Khartoum. Vol. 1**:** 25-37.

F. D'Silva, 1984. *Irrigated Subsector Model of the Sudan*. Washington, D.C.

Preliminary linear programming model of crop activities in the Gezira Scheme. (Draft). USDA/ERS/IED.

Asim Ibrahim el-Moghraby, Ed. 1984. *Water and land use in the Blue Nile Basin: a baseline report*. Khartoum, Sudan, Institute of Environmental Studies, University of Khartoum.

A part of "The Blue Nile Basin Project".

Asim Ibrahim el-Moghraby, 1984. *Water and land use in the Blue Nile basin; a baseline report.* University of Khartoum, Khartoum, Sudan.

Asim Ibrahim el-Moghraby, 1984. The Jonglei Canal. *The Nile Valley Countries: continuity and change*. M. O. Beshir. Khartoum, Sudan, Sudanese Library, Institute of African and Asian Studies, University of Khartoum. Vol. 2**:** 31-42.

Mohammed Osman el-Sammani, 1984. *Jonglei Canal: Dynamics of planned change in the Twic area*. Khartoum, Sudan, University of Khartoum, Graduate College.

An edited and abridged version of the author's PhD thesis; 'Dynamics of planned change in the Twic area'. A review of the history of the canal and its plans and its socioeconomic importance for development in the canal area, the Southern Region and for Sudan and Egypt. Main features of Twic Dinka pastoral life, agriculture and economy are outlined together with problems and perspectives following from the canal project.

Abdalla el-Zubeir and Osman Fadl, 1984. A Note on the History of Participation of Tenants in the Gezira Scheme. *Water distribution in Sudanese irrigated agriculture: productivity and equity. Conference papers*. O. A. Fadl and C. R. Bailey. Wad Medani, Sudan University of Gezira.

Summarizes the increasing role over time of the tenants in the management of the Scheme.

O.A. Fadl and C.R. Bailey, eds., 1984. *Water distribution in Sudanese irrigated agriculture: productivity and equity. Conference papers*. Water Distribution in Irrigated Agriculture: Productivity and Equity, Wad Medani, Sudan, University of Gezira.

Contains 18 papers on the subject. Includes tables on irrigated areas, numbers of tenants, cropping systems and intensities, and water requirements as recorded in the early 1980s.

H.G. Farbrother, 1984. Modernization of Indenting in the Gezira Scheme. *Water distribution in Sudanese irrigated agriculture: productivity and equity. Conference papers*. O. A. Fadl and C. R. Bailey. Wad Medani, Sudan, University of Gezira.

Discussion of evolution of water control in the Gezira. Suggests a new crop water requirement indent to be generated by a joint Sudan Gezira Board/Ministry of Irrigation operations centre.

H. van Gils, 1984. *Remote sensing for mapping and monitoring in Kongor project (SUD 78/016) and Jonglei Canal Area.* International Institute for Aerial Survey and Earth Sciences. Coop: FAO, Enschede, The Netherlands; Rom, Sudan.

A report based on a consultancy mission between February 1 and 25 1984, aiming at assessing whether remote sensing, i.e. satellite imagery and aerial photography, could be used effectively in assessing grassland biomass, the development of maps, monitoring of the creeping flow on the eastern plain, of annual flooding and of annual burn areas. States among other things that the monitoring of burning, river and rain flooding could not be carried out by the Landsat MSS due to scarcity of cloud free images before 1981 and the absence afterwards. Microlight aircraft recommended for this monitoring as well as for cattle census.

Hafslund Consulting Division, 1984. *Democratic Republic of Sudan. Fula Rapids Power Station. Feasibility Study.* Oslo, Norway; Sudan.

Discusses electricity supply and demand in Juba and the rest of Equatoria and presents a proposed design of a Fula Rapids project including transmission lines, project implementation, training and cost estimates. The 24 appendices include a number of tables on past, present and future energy demand and supply in the Juba area. Regards the Fula area as 'feasible for step by step development of the hydro electric power potential of the Nile between Nimule and Juba' (p.10). No discussion of basin-wide water-allocation problems. Based on a field survey in 1979 and 1981.

Abbas Hidayattalla, E.T. Tag el-Din and K.M. Abdu, 1984. Gezira scheme intensification and diversification: a detailed study of watering requirements and the programme for application. *Water distribution in Sudanese irrigated agriculture: Productivity and Equity. Conference papers*. O. A. Fadl and C. R. Bailey. Wad Medani, University of Gezira**:** 126-47.

A.M. Ibrahim, 1984. Concepts of design and practice for irrigation distribution systems in Sudan. *Water distribution in Sudanese irrigated agriculture: Productivity and Equity. Conference papers*. O. A. Fadl and C. R. Bailey. Wad Medani, Sudan, University of Gezira**:** 105-16.

A comprehensive presentation of canal system design and irrigation practices.

H.G. Jansen and W. Koch, 1984. Development of a weed community with the introduction of irrigated agriculture in the Rahad Scheme. *Comptes Rendus du 7ième Colloque International sur lEcologie, la Biologie et la Systematique des Mauvaises Herbes 1984*. Vol. 1**:** 403-10.

Jonglei Executive Organ, 1984. *Report on the 4th meeting for coordination of Jonglei work plan, 1984.* Khartoum, Sudan.

O.M. Kheir, 1984. The consequences of intensification for management of irrigation in the Gezira scheme. *Water distribution in Sudanese irrigated agriculture: Productivity and Equity. Conference papers*. O. A. Fadl and C. R. Bailey. Wad Medani, Sudan, University of Gezira**:** 122-5.

Description of sowing dates, aggregate water requirements and dam operation following intensification.

G.W. Kite, 1984. Regulation of the White Nile. *Hydrological Sciences Journal* 29(2): 191-201.

Summarized investigations made into regulation of the White Nile during Phase III of the WMO/UNDP Hydrometeorlogical Survey of the catchments of Lakes Victoria, Kyoga and Mobuto Sese Seko. A number of historical regulation plans were evaluated using the mathematical model developed by the project. Due to lack of data, economic and ecological effects were not included in the new plans which were drawn up.

E.M. Lates and Omar Mohd Ahmed el-Awad, 1984. *Preliminary study on the discharge-capacity equation of the offtake weir and two night-storage regulators of the Hamza Minor Canal (Gamosia system, Gezira Irrigation Scheme).* Hydraulic Research Station, Wad Medani, Sudan.

E.M. Lates and O.M.A. el-Awad, 1984. *The Discharge Capacity Equations of the Offtake Weir and Two Night Storage Regulators of the Hamza Minor Canal (Gamousia System, Gezira Irrigation Scheme).* Hydraulic Research Station, General Directorate of Projects and Water Resources, Ministry of Irrigation, Wad Medani, Sudan.

Ministry of Agriculture, Sudan. Soil Survey Division (Gezira), 1984. *Semi-detailed soil survey and land suitability classification of the Jonglei Canal Projects Magog, Ayod, Duk Fadiat and Kongor areas, Jonglei Province Upper Nile Region: the report vol. 1.* Soil Survey Division, Wad Medani, Sudan.

Magog, Ayod, Duk Fadiat and Kongor areas cover about 46,415 ha and are located in the area where the government had managed to dig the new canal. In mapping the soils, the Free System was applied using aerial photographs. The soil orders, using the American classification system, were recognized as Vertisols and Alfisols. Includes recommendations, although, by the time the report was finally made public, the war had put a stop to "everything".

Ministry of Agriculture, Sudan. Soil Survey Division (Gezira), 1984. *Semi-detailed soil survey and land suitability classification of the Jonglei Canal Projects Magog, Ayod,*

Duk Fadiat and Kongor areas, Jonglei Province Upper Nile region: the appendices vol. 11. Soil Survey Division, Wad Medani, Sudan.

Gives a brief description of the soil profile of the area at various locations and the results of physical and chemical analysis of the soils.

Ministry of Finance and Economic Planning, Sudan, 1984. *Assessment of past performance 1977-84 transport and communications.* Khartoum, Sudan.

Omer M.A. Mohamed, 1984. *A new model for a Nile waters treaty*. DSRC Seminar, Khartoum, Sudan, University of Khartoum.

Seminar paper.
Discusses legislation in the Nile Basin and strategy for the utilization of the water resources in a northern Sudanese perspective. The relation between Sudan and other Nile Basin countries is presented in socio-economic and geopolitical terms. Developments of the Nile resources are discussed and recommendations made.

Mustafa Abdel-Galil Mukthar, 1984. *Field Data and Model Design Studies for the Head Regulator at Km 36, Rahad Main Canal, Rahad Irrigation Scheme.* Hydraulic Research Station, Wad Medani, Sudan.

Mustafa A/Galil Mukhtar and his team, 1984. *Rahad Irrigation Project: Main Canal Problem.* Hydraulic Research Station, Wad Medani, Sudan.

National Council for the Development of the Jonglei Canal Area, 1984. *Report on Fourth Meeting for Coordination of Jonglei Executive Organ Work Plans, 1984; Bor, 8-10 November, 1983.* Executive Organ, Bor, Sudan.

el-Tayeb Taj-ed-Din, J.R. Hennessy and K.M. Owen, 1984. *Water Control Aspects of the Gezira Irrigation Scheme, Sudan*. Proceedings of the XII Congress of the International Commission on Drainage and Irrigation, Fort Collins, Colorado, USA.

A restatement of principles of water control and distribution in the Gezira and its administration. An appendix describes the physical components (the dam, the main canal headworks, the canal network including the minor canals and canal regulators) of the Scheme as it was in the early 1980s.

T. Tvedt, 1984. *Irrigasjon og okkupasjon: om Sør-Sudans innlemmelse i det britiske imperium.* Chr. Michelsen Institute, Bergen, Norway, Sudan.

Emphasizes the relationship between the hydrological characteristics of the Nile and ecological conditions in Egypt on the one hand and the development of the irrigation system in Egypt under British rule on the other. The author argues that during the 1880s and 1890s a growing gap between water supply

and water demand developed in Egypt which encouraged a British expansionist policy in the Upper Nile Valley in the 1890s.

United Nations Educational, Scientific and Cultural Organization / United Nations Development Programme, 1984. *Establishment of the Hydraulic Research Station, Wad Medani: project findings and recommendations.* Paris, France; Sudan.

J. Wadley, 1984. Environmental impact of Jonglei Canal project. *Epoch* 1(3): 7-10.

The article highlights some of the recommendations in the Permanent Joint Technical Committee's final report, which, according to the author, take into consideration the needs and aspirations of the people of the area, and which particularly respect their social values.

World Bank, 1984. *Project performance audit report. Sudan: Rahad Irrigation Project (credits 364 and 364-1-SU).* Operations Evaluation Department, World Bank, Washington, DC; Sudan.

Contains a project performance audit memorandum and a project completion report. Discusses Bank performance and future directions. (Restricted.)

Abdalla El Zubeir and Osman Fadl, 1984. A note on the history of participation of tenants in the Gezira Scheme. *Op.cit.* O. Fadl and C. Baily.

Hassan A. Abdel-Ati, 1985. *Lower River Atbara area (Nile Province): final report*. Khartoum, Sudan, Institute of Environmental Studies, University of Khartoum.

Prepared for the United States Agency for International Development, project no. 698-0427. September 1985.

C.R. Bailey, 1985. *Water management in the Gezira Scheme, 1920- 1985: an annotated bibliography*. Khartoum, Sudan, Ford Foundation.

A bibliography of articles and publications on water management in the Gezira scheme. Shows the location in the Sudan of the items registered.

M.E. Beshir, 1985. *Land and Water Development in Sudan.* University of Gezira, Wad Medani, Sudan.

A comprehensive survey of natural resource use and development in Sudan over the last 30 years. Draft MS.

M.E. Beshir, 1985. *The Jonglei canal and the Upper Nile swamps*. Khartoum, Sudan, University of Khartoum.

The material presented in this book is divided into four parts. The first two parts are a brief history of

agriculture and a description of the Nile in the Sudan - its tributary systems and Nile water agreements. This is followed by the best-known description of the Sudd region, with an account of the various water conservation schemes put forward. The latter two parts address strategies of water diversion, the routes of diversion to bypass the swamps, environmental aspects of proposed development as well as the potential for and constraints on economic development in the region. Ecological information "available" is then synthesized into ecological hypotheses in an effort to predict some of the outcomes of diverting water away from swamps.

R.O. Collins, 1985. The big ditch: the Jonglei Canal Scheme. *Modernization in the Sudan: essays in honor of Richard Hill*. M. W. Daly. New York, Lilian Barber**:** 135-146.

Outlines the history of the Jonglei Canal from inception of the idea to contruction work by CCI and to the time at which work was stopped due to the activities of SPLA.

L.A. Desougi, 1985. Aquatic weeds in Rahad irrigation canals. *Sudan Journal of Science* 1(1): 13-17.

A survey of aquatic weeds invading irrigation canals in the Rahad Agricultural Scheme carried out in 1978, while the scheme was under construction, and four years later, in 1983. More canals were invaded by aquatic weeds in 1983. *Vossia cuspidata* and *Typha domigensis* were found to be the most dominant species.

C.A. Drijver and M. Marchand, 1985. *Taming the floods: environmental aspects of floodplain development in Africa*. Leiden, The Netherlands, Centre for Environmental Studies, State University of Leiden.

This case-study draws almost entirely on the data and the findings of Mefit-Babtie. Annex E deals with the Jonglei Canal.

B. D'Silva and N. McKaig, 1985. Changing cropping patterns in Sudan's Gezira Scheme: a means of raising food production during drought. *World agriculture outlook and situation report. United States Dept. of Agriculture, Economic Research Service*. Washington, D.C., The Service**:** 38-42.

In 1984, Sudan suffered one of the worst droughts in recent history, requiring unprecedented food imports of over 1 million tonnes. The article assesses whether the Gezira Scheme could be used to increase domestic food production, especially during drought. This analysis argues that reducing cotton area by 200,000 acres could lead to increases in cereal output of between 240,00 and 390,000 tonnes.

Mahasin Ayoub el-Gaddal, 1985. *Family labour supply in the Rahad irrigated Project in the Sudan*. Khartoum, Sudan, National Council for Research, Economic and Social Research Council.

With the rapid expansion of irrigated and mechanised rainfed agriculture, the problem of tenant family labour was aggravated and there was a declining role for family labour in all irrigated schemes and excessive reliance on hired labour. This paper is concerned with the family labour supply in the Radad irrigated project.

M.D. el-Khalifa, 1985. *Blue Nile river from the Ethiopian border to Khartoum; final report.* Univ. of Khartoum, Khartoum, Sudan.

Describes changes in the chemical and biological constituents of the Blue Nile River ecosystem in time (since 1900) and space (from the Sudanese border to Khartoum) caused by the natural regime of rainfall of the watershed area on the Ethiopian plateau. It is argued that the construction of dams has had important effects; during low flood it created the river habitat suitable for the appearance and growth of aquatic weeds, changed water temperature, transparency and suspended matter. The study underlines the lack of data, especially basic information on biological oxygen demand, chemical oxygen demand and also points out the lack of hydrobiological studies on the Blue Nile before the construction of the Sennar Dam. At head of title: Environmental Training & Management in Africa (ETMA), Environmental Management in the Sudan.

Asim Ibrahim el-Moghraby, 1985. Environmental and Socio-Economic Impact of the Jonglei Canal Project, Southern Sudan. *Environmental Conservation* 12(1): 41-48.

Asim Ibrahim el-Moghraby and Mohamed O. el-Sammani, 1985. On the environmental and socio-economic impact of the Jonglei Canal project, Southern Sudan. *Environmental Conservation* 12(1): 41-48.

Local impacts of the Jonglei project on settlements, water quality, fisheries, wildlife and benthos are examined. Argues that the project will foster national, political and economic integration and that it will lead to increased employment, the provision of a new source of fisheries, and flood control.

Euroconsult, 1985. *Jonglei Canal Projects. Semi-detailed soil survey and land suitability classification. Final report.* Democratic Republic of Sudan. Ministry of Agriculture. European Devel. Fund. Soil Survey Administration, Wadi Medani. Euroconsult, Arnhem, The NEtherlands; Sudan.

Vol. 1: Main report. Vol. 2: Annexes. Vol. 3: Maps.

K.I. Hassan and B. D'Silva, 1985. *Costs of Production of Crops in Sudan's Gezira Scheme*. Khartoum, Sudan, University of Khartoum.

J. Jenness, 1985. *Final Report of Project Manager/Land Use Planner to JEO.* Khartoum, Sudan.

G.T. Lako, 1985. The impact of the Jonglei scheme on the economy of the Dinka. *African Affairs* 84(334): 15-38.

A general overview of local aspects related to the Jonglei Canal project. One of the very few articles written by a Southern Sudanese on this question (see also Abel Alier).

E.M. Lates and et al., 1985. *Interim Report: Hydraulic Analysis and Experimental Results for Prototype Design. Hydraulic Analysis of a Compact Flow/Water Volume Measurement-Structure to be Used at Farmer's Ditch (Abu Ashreen) Level.* Hydraulic Research Station, Wad Medani, Sudan

E.M. Lates, Ahmed Salih and Abdalla Abdel-Salam Ahmed, 1985. *Analysis of Main Nile River-Bed Morphology at Abu Halima Pumping Station and Recommendations for Improving the Operation of the Pumping Station.* Hydraulic Research Station, Wad Medani, Sudan.

Yahia Abdel Mageed, 1985. Jonglei Canal: A Conservation Project of the Nile. *Large Scale Water Transfers: Emerging Environmental and Social Experiences*. G. N. Golubev and A. K. Biswas. Oxford (England), Associated Consultants, Khartoum, Sudan, Tycooly Publishing Ltd.**:** 85-101.

Yahia Abdel Magid, former Minister of irrigation and an engineer, gives a brief outline of the Jonglei Canal project with reference to both national and local development plans. Local effects of the canal on environment, people, economy etc. are also discussed. Argues that no climatic changes will occur as a result of the Jonglei Canal. It is underlined that the natural variation in the swamp area is greater than the changes caused by the canal. In unusually dry years, the water withdrawals can be regulated to benefit local wildlife and people, and that livestock grazing will be enhanced by both the permanent water source provided by the canal and the addition of drained swamp to the pasture area. However, migration and movement of some wildlife, notably the migratory tiang, will be curtailed.

R.S. Modawi and et al., 1985. Irrigated summer forages for small dairy farms in the Rahad agricultural scheme: on farm trials. *Research methodology for livestock on-farm trials*. T. L. Nordblom, A. e.-K. H. Ahmed and G. R. Potts**:** 191-208.

Osama Moursy Moussa, 1985. *Analysis of sedimentation in Aswan Reservoir*. Columbus, Ohio, USA, Ohio State University.

Norconsult A.S., 1985. *Kinyetti Hydropower project. Eastern Equatoria, Sudan. Proposal for a programme for consultancy services.* Norconsult, Oslo, Norway; s. Sudan

A proposal for a programme for consultancy services related to plans to build a hydro-power station on Kinyetti, a tributary of the Nile just south of Juba, and running through the East Bank of Eastern Equatoria.

Ahmed Salih and Ahmed Adam Ibrahim, 1985. *Study of Erosion in the Northern Province. Specially prepared for the Conference at Wad Neimeri. Northern Region.* Hydraulic Research Station, Wad Medani, Sudan.

Abdin M.A. Salih, 1985. The Nile inside the Sudan: increasing demands and their consequences. *Water International* 10(2): 73-78.

Considers the impact of vast water abstractions from the Nile river in the Sudan for downstream users. To facilitate assessment of consequences, the annual flows of the Nile and its major tributaries together with the correspondingly increased water demands are discussed. Considerable portions of the total annual flow will be heavily depleted when short- and medium-term plans for water abstractions are implemented. Changing river flow regimes, increased pollution, and water storage effects are possible environmental consequences.

Sir M. MacDonald and Partners Ltd, 1985. *Northern region agricultural rehabilitation project: proposal for study of pump schemes, volume I: technical*. Cambridge, UK.

Advocates a programme to overcome the immediate problems of inadequate water supply and declining cropping intensity in the Northern Province of the Sudan. The study involves two distinct types of development, one being the rehabilitation and possible improvement and expansion of the existing schemes, and the other the construction of new schemes of Affat and Seleim. (From: SSA).

Sudan. National Energy Plan Committee. National Energy Administration, 1985. *The national energy plan, 1985-2000.* Khartoum, Sudan.

D. Whittington, 1985. Nile water for whom?: emerging conflicts in water allocation for agricultural expansion in Egypt and Sudan. *Agricultural development in the Middle East*. K. E. Haynes. Chichester, UK; New York, Wiley, 1985. (OCoLC)11916165**:** 125-149.

D. Whittington, 1985. *Implications of Ethiopian Water Development for Egypt and Sudan*. DSRC Seminar paper, Khartoum, Sudan, Univ. of Khartoum.

The subject of this paper is the implications for Egypt and Sudan of the likely long-term development of the Blue Nile resources in Ethiopia'. The first section describes the long-term investment programme recommended by the US Bureau of Reclamation. In the second part a linear programming model is presented, employed to examine the consequences for Egypt and Sudan of such changes. In the third section the results of the analysis are represented, arguing that the building of dams in Ethiopia can benefit both Ethiopia and Sudan.

World Bank, 1985. *Power rehabilitation project - Sudan.* Sudan.

The project aimed to help ensure the efficient utilization of existing power facilities, improve power supply reliability, and assist in the financing of urgently needed additions of capacities and urgently required rehabilitation works to meet the growing power demand at least cost to the economy. The project would contribute to institution building and strengthening of power subsector organization, establishment of long-term development policy, tariff reforms, load management and energy conservation, and subregional power system interconnections. The project included: (a) addition of 2 x 10 MW diesel units at Burri; (b) rehabilitation of units 1 and 2 at Roseires hydropower station; (c) spare parts for the Sennar

hydropower station; (d) rehabilitation of the Blue Nile and the Eastern Grid installations; and (e) consultancy services for supervision of project implementation and coordination of management improvement, and the performance of studies and feasibility reports.

World Bank, 1985. *Agricultural research, extension and training projects in the irrigated subsector - Sudan.*Sudan.

The project objective was to improve crop production in the irrigated subsector through improvements in research, extension and training. Over a 6-year period, the project was to strengthen the technological base required for higher production, reform the subsector extension system, and upgrade the skills of field personnel. The project would (a) rehabilitate and strengthen agricultural research at five regional stations in the irrigation areas; (b) upgrade the skills of field inspectors and establish programmed extension services at New Halfa and Rahad Corporations; (c) strengthen the National Extension Administration; and (d) strengthen the in-service training capabilities of the University of Gezira.

Siddiq Eissas Ahmed, 1986. *Technical Introduction to Gezira Scheme Management.* Hydraulic Research Station, Wad Medani, Sudan.

Abdalla A. Ahmed, Omer el-Awad and Siddig Eissa Ahmed, 1986. *Memorandum on some Irrigation Problems on New Halfa Irrigation Scheme.* Hydraulic Research Station, Wad Medani, Sudan.

Ahmed Humeida Ahmed Ali, 1986. The Irrigated sub-sector of agriculture in the Northern Region. *The Agricultural sector of Sudan: Policy and systems studies*. A. B. Zahlan. London, UK) Ithaca Press**:** 161-178; 424.

H.R.J. Davies, 1986. *Rural development in White Nile Province, Sudan: a study of interaction between man and natural resources*. Tokyo, Japan, United Nations University.

B.C. D'Silva, 1986. *Sudan's irrigated subsector. Issues for policy analysis.* United States. Dept. of Agriculture. Economic Research Service. International Economic Division., Washington, D.C.; Sudan.

Describes the irrigation sector, its history and how it has been shaped by cotton production. Argues that the relatively improved competitive situation of sorghum compared to cotton requires an analysis of the implications of changing cropping patterns. There will be a need for new and different institutional arrangements within the irrigation sector.

P. Greenaway, 1986. Nile Navigation Study. *Dock & Harbour Authority* 67(780): 37-8.

A consultancy report on the potential for commercial river services along a 450 km length of the river in Northern Sudan. Concludes that a major river transport systems was unlikely to be economic.

H.O. Hassaballa, 1986. *Social Change and Society Transformation in the White Nile Province: The Kenana Project (Technology, Rural Sudan).* Seattle, Wash., USA, University of Washington.

This study deals with the Kenana project close to Kosti in Sudan, a project for producing sugar.

F.N. Ibrahim, 1986. Nubien - das Ende einer Kultur im Stausee. Die Auswirkungen des Hochstaudammes von Assuan in ökologischer und ethischer Sicht. In: "Nach uns die Sintflut" (ÖKOZID 2). *Jahrbuch für Ökologie und bedrohte Kulturen*: 99-118.

A.N. Khan and et al., 1986. *Staff appraisal report, Sudan, Northern Province irrigation rehabilitation project.* World Bank, Washington, DC; Sudan.

This report is based on the findings of an appraisal mission in June-July 1986. The project aimed to arrest the trend of deterioration in production by smallholdings and increase food production capacity and farm incomes.

W.Y. Magar, 1986. The White Nile pump schemes. *The Agricultural sector of Sudan: Policy and systems studies*. A. B. Zahlan. London, UK, Ithaca Press**:** 179-191.

Argues that the irrigation schemes operating in the Kosti-Renk and Dueim regions of Sudan aimed to promote the production of cotton and food crops (mainly dura or sorghum) for self-sufficiency and for distribution to other regions of the country. Another goal was to offer a sedentary life and increased material standards for the nomadic inhabitants of the area. The role played by the schemes in agricultural production was analysed with reference to the supply of water, credit, other farm inputs and agricultural information and the purchase of farm products.

Abdelhalim Hamid Mohamed, 1986. *Resource allocation and enterprise combination in a risky environment: case study of the Gezira Scheme, Sudan*. PhD. Oklahoma State University 1984.

Ann Arbor, Mich.: University Microfilms International, 1986. 22 cm.

Omer Mohamed Ali Mohamed, 1986. *Proposal for a Nile waters treaty*. Biblio info

The paper seeks to ‘attain rational conclusions in favour of peace and development' through a brief examination of the legal framework; the utilization of the resource is discussed and a structure for cooperation is proposed. The author worked in the Department of Political Science, University of Khartoum. The 1959 Nile Waters Treaty is annexed.

Abu Bakr Mohd El Mustafa, 1986. *Rahad Main Canal Problems. III parts.* Hydraulic Research Station, Wad Medani, Khartoum, Sudan.

M. Salam, 1986. Agricultural policy formation and irrigation. *The Agricultural sector of Sudan. Policy and systems studied*. A. Zahlan. London, UK, Ithaca Press**:** 409-424.

R.B. Salama, 1986. *The evolution of the river Nile in relation to buried saline rift lakes and water resources of Sudan*. University of New South Wales, NSW, Australia.

Argues that after the cessation of the subsidence and the filling up of the rift basins (the Sudanese Cainozoic rift system forms the largest rift system in Africa and includes the Bahr Al-Arab rift, the White Nile rift, the Blue Nile rift, the River Atbara rift and the Wadi Ek Kuu rift), the rivers started to overflow and connect with each other. The author states that the easterly river basin, River Atbara, connected first, followed by the Blue Nile and lastly by the White Nile 12,500 years B.P. to form the existing River Nile.

Ahmed Salih and Abdalla Abdel-Salam Ahmed, 1986. *The Effect of the Proposed Brick Factory at El Bagair on the Blue Nile Regime.* Hydraulic Research Station, Wad Medani, Sudan.

Ahmed Salih and et al., 1986. *Data Collection, Model Design and Construction.* Hydraulic Research Station, Wad Medani, Sudan.

1st Draft.

T. Tvedt, 1986. *Water and politics: a history of the Jonglei Project in the Southern Sudan*. Bergen, Norway, Univ. of Bergen; Chr. Michelsen Institute.

Based on hitherto unused written documents from British administrators in the Sudan and from British water planners in Egypt, it provides a presentation of the different plans for the Upper Nile and the canalisation of the Sudd area from the early 1890s until the 1970s. It discusses a "hydraulic" theory as helpful in analysing British Nile politics. Master's thesis.

C.R. Williams, 1986. *Wheels and paddles in the Sudan: (1923-1946)*. Edinburgh, UK, Pentland Press.

The author served with the Sudan Railways form 1923 to 1946, the last seven years at its headquarters, responsible for collection of detailed knowledge on the waterways of Southern Sudan. He made numerous trips along all the major waterways in the area. The second half of the book (p.151-312) is an account of his travels, supplemented by geographic and ethnographic information. Pp. 306-311 provide a description of a trip through the Jonglei area.

World Bank, 1986. *Northern province irrigation rehabilitation projects - Sudan (IFAD project).*Sudan.

The project aimed to increase the food production capacity and farm incomes of the smallholder farmers in the Northern Agricultural Production Corporation (NAPC) schemes, thus contributing to food supply stabilization in the Northern Province. Complementing previous IFAD support for agricultural development, the project comprised several components including the (a) rehabilitation of five NAPC irrigation schemes covering about 19,000 feddans and establishment of a new scheme of about 2,500 feddans area at Affad. In addition, the project entailed (b) provision of extension services, short-term

input credit, medium-term agricultural implements credit, plant protection services, and support for a programme for orchard trees and facilities for livestock. The project also provides (c) support for the desert encroachment programme; (d) funds to strengthen women's extension activities; and (e) institutional development strengthening through recruitment of qualified consultants, staff training and improvement of facilities.

The World Bank, Eastern and Southern Africa Region, Northern Agriculture, 1986. *Staff appraisal report: Sudan, Northern Province irrigation rehabilitation project.* International Fund for Agricultural Development (IFAD) (Funder), Washington D.C.; Sudan.

The proposed project aimed to arrest the deteriorating trend in smallholder production. The project was intended to increase the food production capacity and farm incomes of the smallholder farmers, thus contributing to food supply stabilisation in the Northern Province. The project included the rehabilitation of irrigation schemes in the Northern Agricultural Production Corp., support for the desert encroachment programme, funds to strengthen women's extension activities, recruitment of qualified consultants and staff training.

Y.A. Yath and H.A.M.J. van Gils, 1986. Multi-temporal Landsat for land unit mapping on project scale of the Sudd-floodplain, southern Sudan. *Remote sensing for resources development and environmental management. Proceedings 7th ISPRS Commission VII symposium, Enschede, 1986*. M. C. J. Damen and et al. Rotterdam, The Netherlands; Jonglei Executive Organ, Khartoum, Sudan, Balkema. Vol. 1**:** pp.531-2; 547.

Argues that since the most important environmental phenomena in the Sudd area - the flooding - can be assessed only on sequential series of photographs, the studies of the Sudd flood plain on a regional scale, carried out as environmental impact study for the Jonglei Canal project, have been of limited value on project scale. Symposium paper. Symposium: 7th ISPRS Commission VII Symposium, Enschede, 1986.

A. K. Abdalla, 1987. *Changes in the management control systems and the improvement in the productivity of cotton: the case of the Gezira scheme, Sudan*. Bath, UK, University of Bath..

Mahdi E. Bashir, 1987. On the history of planning for the Jonglei Canal. *International Journal of Water Resources Development* 3: 127-32.

A survey written after all work had stopped on the project.

M.E. Beshir, 1987. On the History of Planning for the Jonglei Canal. *International Journal of Water Resources Development* 3: 127-32.

An account by one of those involved in the planning of the project in the 1970s and 1980s.

H. Brandt, 1987. *Potential contribution of irrigated agriculture to food security in the Sudan: the case of the Gezira irrigation scheme*. Berlin, Germany; Abu Haraz, Sudan, German Development Institute; College of Agriculture and Natural Resources.

Centre d'Etudes et de Documentation Economique Juridique et Sociale, Département des sciences sociales, Mission française de recherche et de coopération, 1987. *Le Soudan et la vallée du Nil*. Cairo, Centre d'Etudes et de Documentation Economique Juridique et Sociale Département des sciences sociales Mission française de recherche et de coopération. ¿? Biblio info

P. Chesworth and H.G. Farbrother, 1987. *Irrigation Field Trials on the Montmorillonitic Cracking Clay Soils of the Radah Irrigation Project*. International Commission on Irrigation and Drainage, Twelfth Congress, Q 38 R 5.

Field irrigation trials were undertaken on the montmorillonitic cracking soils at the Rahad irrigation project. The fields were under cotton cultivation with furrow slopes of about 65 and 25 cm per km. The trials quantified the distribution of irrigation water along the length of long furrows of different slopes.

Omer el-Khalifa el-Siddiq, 1987. *Nutritional evaluation of promising irrigated grass and legume forages and some local animal feeds for dairy production in the Rahad Scheme*. Wad Medani, Sudan, University of Gezira.

M. Hulme, 1987. *An annotated bibliography of the climate of Sudan*. Cambridge, .

This annotated bibliography contains more than 240 works exclusively concerned with the climate of Sudan, published between 1829 and 1987. The purpose of the bibliography is to facilitate access to the large amount of literature on the Sudanese environment. The subject is divided into seven categories; general climatology, meteorology, precipitation, applied climatology, evaporation, climatic change, atmospheric dust and monthly/annual reports or publications.

International Journal of Water Resources Development, 1987. Management of the Upper Nile. *International Journal of Water Resources Development* 3(2): 90-147.

Special Issue.

Jonglei Executive Organ, 1987. *Development studies in the Jonglei canal area: water supply.* Khartoum, Sudan.

M. Keen, 1987. New channels for the waters of the Nile. *Ceres. The FAO Review (FAO)* v. 20(6) = no. 120: pp. 16-20.

Osama Moursy Moussa, 1987. *Satellite data based sediment-yield models for the Blue Nile and the Atbara River Watersheds*. Columbus, Ohio, USA, Ohio State University.

A. Shepherd, M. Norris and J. Watson, 1987. *Water planning in arid Sudan*. London, UK, Ithaca Press.

This comprises three distinct studies: what the authors consider to be descriptions of a rational system for water planning; an account of the historical, institutional and political background of the water planning system in the Sudan; and an investigation into the decline of planning and its replacement by a politically determined allocation.

Sir Alexander Gibb and Partners, 1987. *Updating of the Feasibility Study for the Heightening of Roseires Dam. Final Report.*Sudan.

J.V. Sutcliffe and Y.P. Parks, 1987. Hydrological Modelling of the Sudd and Jonglei Canal. *Hydrological Sciences Journal* 32(2): 143-159.

The water balance of the Sudd is represented by a hydrological model which uses measured inflows and outflows and estimates of rainfall and evaporation to reproduce volumes and areas of flooding over the historical period 1905-1980.

T. Tvedt, 1987. *Om vannprosjekter og interessekonflikter i utviklingslandene: to historiske eksempler*. Bergen, Norway, Chr.Michelsen Institute.

Discusses water projects in general, but with a particular emphasis on the Nile (the Aswan project and the Jonglei Canal).

United Nations; Department of Technical Co-Operation for Development, 1987. *Establishment of a water-point maintenance unit on the West Bank of the Nile in the Equatoria Region. Project findings and recommendations.* UN, New York,Sudan.

The report, prepared by the project consultant, describes activities and achievements of this project in Yei River District from June 1985 until it was terminated at the end of 1986. It recommends that some sort of self-financing is necessary after it is handed over to the government; i.e. the users will have to pay for at least parts of the running costs.

The report rules out the possibility that local traders will stock pump spare parts etc. It underlines that technology should 'be strictly related to social organisation in all activities concerning the water supply of rural communities'.

R.P.D. Walsh and M. Hulme, 1987. Recent rainfall changes and their impact on hydrology and water supply in the semi-arid zone of the Sudan. *Geographical Journal* 153(3).

Shows that rainfall decline in semi-arid Sudan since 1965 continued and intensified in the 1980s, with 1984 being the driest year on record. In White Nile Province annual rainfall in 1965-84 was 40% below 1920-39 levels: wet season length was reduced by 39-51%; and the frequency of both large and minor daily falls had declined by up to 51%. Argues that models of the hydrological impact of rainfall decline must take into account local physical and human conditions, changes in a variety of rainfall parameters

and different types of human response to drought in order to be useful.

World Bank, 1987. *Economic analysis of irrigation rehabilitation projects.* Sudan.

This paper discusses the assessment of the costs and benefits of irrigation rehabilitation and modernization projects, and summarizes the methodology used at the World Bank to assess the economic viability of agricultural projects in general, and discusses some of the particular characteristics of the irrigation rehabilitation projects. It then introduces four examples to illustrate the discussion. These examples represent the most frequent types of irrigation rehabilitation and modernization projects the Bank is invited to finance. They comprise 'standard', straightforward rehabilitation projects; one involving basically electro-mechanical works (Sudan) and the other civil engineering works (Peru); one project with an important modernization and expansion component (Greece) and one to preempt the catastrophic failure of the system involved (India). Lastly, the report includes a summary of the four case studies of the above projects, prepared on the basis of World Bank appraisal and supervision reports.

H. M. Adam and S. A. Hamed, 1988. *Feasibility Study about Bank Erosion in the Northern Province.* Ministry of Irrigation and Water Resources, Wad Medani, Sudan.

Tag-el-Sir Ahmed and Osman el-Tom Hamad, 1988. Sediment transport in relation to reservoirs. *Proceedings of the international conference on water resources, needs and planning in drought prone areas, part 1*. I. M. Abdel-Magid and (et al.). Khartoum, Sudan**:** 281-95.

Analyses the evolution of sedimentation and its drastic consequences on irrigated agriculture and hydro powergeneration at Khashm el Girba and Roseires particularly during the drought years in the 1980s. Discusses the sedimentation control measures developed and particular constraints and limitations pertaining to each reservoir. Paper presented to the International Conference on Water Resources, Needs and Planning in Drought Prone Areas, Khartoum, Dec. 6-12, 1986. Collaborator: UNESCO, UNDP, Sudan Engineering Society and International Association for Hydraulic Research.

Abdalla A. Ahmed, Siddig E. Ahmed and Ahmed S. Hussein, 1988. Performance of hydraulic structures in the Gezira Scheme. *Proceedings of the international conference on water resources, needs and planning in drought prone areas, part 1*. I. M. Abdel-Magid and et al. Khartoum, Sudan**:** 219-38.

Evaluates the four types of hydraulic structures in the Gezira Scheme (gate regulators, Butcher's movable weirs, night storage weirs and field outlet pipes), concludes that more attention should be paid to the maintenance and calibration of the hydraulic structures and proposes that the design sheet file of the Ministry of Irrigation should be revised. Paper given at the International Conference on Water Resources, Needs and Planning in Drought Prone Areas, Khartoum, Dec. 6-12, 1986. Collaborator: UNESCO, UNDP, Sudan Engineering Society and International Association for Hydraulic Research.

Abdalla el-Sadig Ali, 1988. Estimating reservoir surface area from landsat imagery. *Proceedings of the international conference on water resources, needs and planning in drought prone areas, part 2*. I. M. Abdel-Magid and et al. Khartoum, Sudan**:** 671-7.

Paper presented at the International Conference on Water Resources, Needs and Planning in Drought Prone Areas, Khartoum, Dec. 6-12, 1986. Collaborator: UNESCO, UNDP, Sudan Engineering Society

and International Association for Hydraulic Research.

J.D. Balarin, 1988. *National reviews for aquaculture in Africa. 17. The Sudan.* FAO, Rome, Sudan.

A broad overview of aquaculture potential in the Sudan, including the South and the Sudd area.

V. Bernal, 1988. *Losing ground: women and agriculture on Sudan's irrigated schemes, lessons from a Blue Nile village*.

R.O. Collins, 1988. The Jonglei Canal: illusion or reality? *Water International* 13(3): 144-153.

Portions of this article had previously been presented in the Sixth Trevelyan Lecture at Trevelyan College at the University of Durham, UK. A short version of the author's work on the history of the canal, concluding with the SPLA's attack on CCI to cease operations: 'Behind the dying body of the "Bucketwheel" stretches the Big Ditch where half a ditch is worth less than none at all'.

Mohammed Osman el-Sammani, 1988. The Jonglei Canal: the evolution of the project model. *North-South relations in the Sudan since the Addis Ababa Agreement*. M. K. N. Arou and B. Yongo-Bure. Khartoum, Sudan, KUP**:** 408-419.

Reviews the conceptualization and development of the Jonglei Canal project, visualized and named Equatoria Nile Project in 1936, and in 1948 modified and renamed Nile Basin Project, and then the Jonglei Investigation Team was formed to study how the canal would affect the local people. The author argues that the last project from 1979 was for both Sudan and Egypt, unlike earlier ones, which were wholly for Egypt. He also argues that this project would also benefit the local people; they would have irrigated land, threat of floods removed, roads, and an improvement in their livestock holding, etc.

Saghayroon el-Zein, 1988. State of the art review with respect to irrigation in the Sudan. *Proceedings of the international conference on water resources, needs and planning in drought prone areas, part 1*. I. M. Abdel-Magid and et al. Khartoum, Sudan**:** 213-218.

Reviews the case of small quantity and low-flow irrigation, and the importance of measurement and efficient conveyance of the available quantities. Argues in support of more research and technical work on how to use the stored water and the low flows more efficiently. International Conference on Water Resources, Needs and Planning in Drought-Prone Areas, Khartoum, Dec. 6- 12, 1986. Collaborator: UNESCO, UNDP, Sudan Engineering Society and International Association for Hydraulic Research.

Euroconsult, Sir Alexander Gibb and Partners and Newtech, 1988. *Rehabilitation of the Gash Delta agricultural project, final report.*.Sudan.

This report was commissioned by the Ministry of Finance and Economic Planning, Sudan.

D.G. Fontane and Yacoub Abu Shora Musa, 1988. Development of river basin operational guidelines for favourable distribution of shortages, case study: Nile Basin in

Sudan. *Proceedings of the international conference on water resources needs and planning in drought prone areas, part 1*. I. M. Abdel-Magid and et al. Khartoum**:** 391-409.

Paper presented at the International Conference on Water Resources, Needs and Planning in Drought Prone Areas, Khartoum, Dec. 6-12, 1986. Collaborator: UNESCO, UNDP, Sudan Engineering Society and International Association for Hydraulic Research.

M.R.H. Francis and Omer el-Awad, 1988. A study of the management of minor canals in the Gezira irrigation scheme, Sudan. *Proceedings of the international conference on water resources, needs and planning in drought prone areas, part 1*. I. M. Abdel-Magid and (et al.). Khartoum, Sudan**:** 297-314.

B. Ganong, 1988. *Master Plan for Development of the Jonglei Canal Area. Terminal Report. Draft. Project No SUD/84/004.* Sudan.

This report is listed in the library catalogue of the Permanent Joint Technical Commision for Nile Waters (PJTC), Khartoum.

B. Ganong, 1988. *Draft master plan for development of the Jonglei Canal area: terminal report.* UNDP, Sudan.

Gash Delta Agricultural Coorperation, 1988. *Irrigation Report.* Sudan.

N. Ghezae, 1988. *Blue Nile water development and the expansion of irrigated agricultural sector in the Sudan*. Uppsala University, Sweden.

Deals with the role of the Blue Nile and its water in the economy of the Sudan, especially within the agricultural sector. Its analysis and conclusions are largely based on secondary sources like Gaitskell, Waterbury etc.

Osman el-Tom Hamad, Abdalla A. Salam Ahmed and Ahmed Khalid El Daw, 1988. Impact of drought on the Gezira scheme irrigation needs. *Proceedings of the international conference on water resources, needs and planning in drought prone areas, part 2*. I. M. Abdel-Magid and et al. Khartoum, Sudan**:** 912-55.

Shows that water released to Gezira Scheme from Sennar Dam during the rainy season continued to increase every year from 1981 to 1984. This was found to be a direct result of successive decreases in rainfall over the Scheme area. The two main canals conveyed their maximum discharge capacity throughout the 1984 rainy season, for the first time in their history. Despite this, they failed to satisfy the irrigation needs imposed by the drought. The factors influencing the irrigation needs were investigated.

Paper presented to the International Conference on Water Resources, Needs and Planning in Drought Prone Areas, Khartoum, Dec. 6-12, 1986. Collaborator: UNESCO, UNDP, Sudan Engineering Society

and International Association for Hydraulic Research.

P.P. Howell, 1988. *Local effects in the canal zone*. Cambridge, UK, Cambridge University Press (Cambridge Studies in Applied Ecology and Resource Management).

P.P. Howell, M. Loch and S. Cobb, Eds. 1988. *The Jonglei Canal. Impact and opportunity*. Cambridge, UK, Cambridge University Press.

Describes the background and the plans for the Jonglei Canal and their implementation, and the local and regional impact of the canal. Fourteen authors contribute to this study, representing hydrology, zoology, botany, ecology, marine biology, agronomy, history, anthropology and political science. The book consists of six parts; the historical and international aspects of Nile control, the hydrology of the White Nile and her sources and its impact on the Sudd region, the history of human adaptations in the Jonglei area, local exploitation of natural resources, possible local effects of the canal, and past experiences and future needs of rural development. The book presents a summary of the acquired knowledge of the region.

D.H. Johnson, 1988. Adaptation to Floods in the Jonglei Area: a Historical Analysis. *The Ecology of Survival*. D. H. Johnson and D. Anderson. London.

G.T. Lako, 1988. The Jonglei scheme: the contrast between government and Dinka views on development. *Sudan: state, capital and transformation*. T. Barnett and A. Abdelkarim. London, Croom Helm**:** 85-98.

Compares government attitudes to the Jonglei scheme with those of the Dinka (based on a 1981 sample survey). Assesses future implications of the Scheme for social differentiation among the Dinka.

E.M. Lates and B.E.F. el-Monshid, 1988. A seasonal variation of conveyance of Gezira and Managil irrigation main canals downstream of Sennar Dam and its explanation. *Proceedings of the international conference on water resources, needs and planning in drought prone areas, part 2*. I. M. Abdel-Magid and et al. Khartoum, Sudan**:** 981-86.

Paper presented at the International Conference on Water Resources, Needs and Planning in Drought Prone Areas, Khartoum, Dec. 6-12, 1986. Collaborator: UNESCO, UNDP, SES (Sudan Engineering Society) and IAHR (International Association for Hydraulic Research).
(From: SSA).

Mustafa Abdel Galil Mukhtar, 1988. Optimum canal design, with special reference to Gezira canalisation system. *Proceedings of the international conference on water resources, needs and planning in drought prone areas, part 1*. I. M. Abdel-Magid and et al. Khartoum, Sudan**:** 269-280.

Paper presented at the International Conference on Water Resources, Needs and Planning in Drought Prone Areas, Khartoum, Dec. 6-12, 1986.
Collaborator: UNESCO, UNDP, Sudan Engineering Society and International Association for Hydraulic Research.

Multi-Donor Mission, 1988. *Emergency flood reconstruction program*. Khartoum, Sudan.

In August/September 1988 Sudan experienced very high levels of rainfall and flooding of the Nile. These events caused devastation for a large portion of the population, damaging agriculture, property and infrastructure. The Prime Minister of the Sudan requested the World Bank to lead a multi-donor, multi-sector effort to assess the reconstruction needs and to outline an Emergency Flood Reconstruction Program which could be supported by donors. This document is the product of that mission; assessing the damage and providing a design for reconstructions program, encouraging commitments to long-term economic reform. It pointed out the need for Sudan to embark on a significant economic adjustment programme to provide the basis for sustained growth and development.

Yacoub Abu-Shora Musa and R.A. Young, 1988. Effect of water shortage on the value of irrigation water: Gezira Scheme. *Proceedings of the international conference on water resources, needs and planning in drought prone areas, part 1*. I. M. Abdel-Magid and et al. Khartoum, Sudan**:** 981-86.

Paper presented to the International Conference on Water Resources, Needs and Planning in Drought Prone Areas, Khartoum, Dec. 6-12, 1986. Collaborator: UNESCO, UNDP, Sudan Engineering Society and International Association for Hydraulic Research. Argues that water can only be efficiently allocated when its value in alternative uses is compared. In this study linear programming was used to analyse the value of water used in irrigation for Gezira Scheme. Factors assumed to affect the estimates of value include the productivity of water, its scarcity, efficiency of field water use, planting dates, crop prices, crop yields and production costs.

Mohamed Akode Osman and El Fatih Mohamed Ali, 1988. River bank erosion downstream of the Blue Nile bridge. *Proceedings of the international conference on water resources, needs and planning in drought prone areas, part 1*. I. M. Abdel-Magid and et al. Khartoum, Sudan**:** 1007-16.

Paper presented at the International Conference on Water Resources, Needs and Planning in Drought Prone Areas, Khartoum, Dec. 6-12, 1986. Collaborator: UNESCO, UNDP, Sudan Engineering Society, and International Association for Hydraulic Research.

Sir Alexander Gibb & Partners, 1988. *Draft report on damage to irrigatrion schemes at New Halfa Rahad Gezira and Blue Nile pump schemes following the August September 1988 flood.*Sudan.

This reports has been scanned by Jacobs, Reading, UK, (former Sir Alexander Gibb and Partners) and can be obtained from their electronic archive.

Sir Alexander Gibb and Partners, 1988. *Republic of Sudan White Nile pump schemes m modernisation study: Inception report.* Sudan.

B. Wallach, 1988. Irrigation in Sudan since independence. *The Geographical Review*

78(4): 417-34.

A.M.A. Ali, 1989. Heavy Rainfall at Khartoum on 4-5 August 1988: a Case Study. *Meteorological Magazine* 118: 229-35.

An analysis of the dramatic rainfall in Khartoum on 4-5 August 1988.

R.G. Bailey, 1989. An appraisal of the fisheries of the Sudd wetlands, River Nile, southern Sudan. *Aquaculture and Fisheries Management* 20(1): 79-89.

The author, working in the Biosphere Sciences Division, King's College London, reports on a survey of fisheries in the Sudd carried out between 1980 and 1983. Data were obtained by observation and measurements during visits throughout the study area, except the Zeraf region, and by experimental gill-net fishing. Gives information on both fresh and processed fish, which were identified and weighed. The distribution and numbers of canoes were obtained from counts incorporated into aerial surveys carried out for Mefit-Babtie study. Argues that fishery resources were underexploited but that an expansion of the commercial sector was hampered by local constraints, and that unless the natural river discharges revert to pre-1961 levels, construction of the Jonglei Canal would not be a threat to fishery resources.

A.G. Duk, 1989. *Hydropolitics of the 'Sudd' fisheries of the Southern Sudan*. Humberside, UK, Humberside College of Higher Education.

The Sudd plain hosts the Monythany Dinka who totally depend on fish, the Dinka groups and Nuer pastoralists, and the Shilluk. It provides rich pasture for cattle and wildlife during the dry season and security for the people during war. Argues that the proposed Jonglei Canal will alter the hydrological region of the area with devastating effect. Recommends the formation of a Nile Water Council for all riparian countries.

J. Hateboer, 1989. *Report on the 1988-1989 Maintenance, Repair and Construction Program.* Gash Delta Agricultural Corporation, Sudan.

Ministry of Finance and Economic Planning, Republic of the Sudan, 1989. *Es Suki pump irrigation scheme: organization and management study: summary of final report.* Sudan.

Sir Alexander Gibb & Partners, 1989. *Republic of Sudan Roseires Dam: Note on proposed strategy for rehabilitation of the instrumentation system.* Sudan.

This reports has been scanned by Jacobs, Reading, UK, (former Sir Alexander Gibb and Partners) and can be obtained from their electronic archive.

Sir Alexander Gibb and Partners, 1989. *White Nile Pump Schemes Modernization Study. Final Report.* Sudan.

Sir Alexander Gibb& Partners, 1989. *Sub-Saharan Africa Hydrological Assessment (IGADD Countries). Final Report by Sir Alexander Gibb & Partners to World Bank-UN Development Programme.* Sudan.

United Nations Development Programme, 1989. *Egypt and the Sudan: transnational project on the major regional aquifer in North-East Africa.* Sudan.

Abdel Alier, 1990. *Southern Sudan; Too Many Agreements Dishonoured*. London, UK, Ithaca Press.

Written by the former Vice-President under Nimeiri; president of The High Executive Council for the Region of Southern Sudan in 1972-77 and 1980-81, and leader of the Khartoum government delegation to the Addis Ababa talks in 1972, this book gives a wealth of detailed information about Sudanese politics. It is no conventional autobiography, rather the book attempts to present a balanced description and analysis of the problems leading to the second civil war, with proposals for peace. It also deals specifically with the White Nile projects.

L.S. Boxberger, 1990. *The Jonglei Canal in southern Sudan: evolution of a development project*. Austin, Texas, USA, University of Texas at Austin.

R.O. Collins, 1990. *The waters of the Nile: hydropolitics and the Jonglei Canal, 1900-1988*. Oxford, UK, Clarendon Press.

The first book that aims at a rather broad historical analysis of hydropolitics in the Nile basin, with a special focus on the Jonglei Canal. Discusses both British and Egyptian plans for the White Nile from the beginning of the 20th century until the present day. Based on primary sources.

L. Fruzzetti and Á. Östör, 1990. *Culture and change along the Blue Nile: courts, markets, and strategies for development*. Boulder, Colo, USA, Westview Press.

Applied anthropology in the Blue Nile River Valley.

Fatma Isikdag, 1990. *Household livelihood strategies and women's agricultural work: the Gezira Scheme, Sudan*. PhD Thesis, University of California, 1988.

Photocopy. Ann Arbor, Mich.: UMI Dissertation Information Service, 1990. vi, 240 p. : ill ; 22 cm.

Hydraulics Research Limited, 1990. Research for Rehabilitation of Gezira Irrigation Scheme: Siltation Monitoring Study. Final Report EX2244, Appendix C.

H.L. Plusquellec, 1990. *The Gezira irrigation scheme in Sudan: objectives, design, and*

performance. Washington, D.C., USA, World Bank.

A study of the Gezira scheme from the year after Beshir took power in 1989, and turned the Sudan into a leading propagandist for radical Islamist revolutions all over the world.

S.E. Smith and Hussan M. Al-Rawahy, 1990. The Blue Nile: Potential For Conflict And Alternatives For Meeting Future Demands. *Water International* 15(4): 217-222.

Abdel-Basit Ahmed Awadel-Karim, 1990? *Rural settlement planning and service provisions in the Gezira irrigated areas*. Queen's University of Belfast 1981. Boston Spa, Wetherby: The British Library Document Supply Centre.

T. Barnett, 1991. *Sudan: the Gezira scheme and agricultural transition*. London, UK, Frank Cass.

R.O. Collins, 1991. *The Waters of the Nile: An Annotated Bibliography*. London, Melbourne, Munich, New York., University of California at Santa Barbara. Hans Zell Publishers.

The first bibliography on the Nile. It is only partially annotated. A great number of central works are not included. The references are generally inaccurate (one funny example: Oslo is twice said to be in Sweden). A number of works are included without a clear reason (works on Angola, Canada, the British Lake District etc.). The same entries can appear in more than one place, and often with different bibliographical information. A useful, but disappointing work.

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S. Elsheikh, A. Kaikai and K. Andah, 1991. Intensive sediment transport from the upper Nile Basin and water resources mangement in Sudan. *Hydrology for the water mangement of large river basins*. F. H. M. Van de Ven, International Union of Geodesy and Geophysics. 201**:** 291-300.

S. el-Sheikh, A. Kaikai and K. Andah, 1991. Intensive sediment transport from the upper Nile Basin and water resources mangement in Sudan. *Hydrology for the water mangement of large river basins*. F. H. M. Van de Ven, International Union of Geodesy and Geophysics**:** 291-300.

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Hoogeveen, 1991. *Gash Delta Pilot Rehabilitation Project.* Gash Delta Agricultural Corporation,Sudan.

Rashwan Mohamed Ibrahim, 1991. *A modified water release policy for the Nile River*. Fort Collins, Colo, USA, Colorado State University.

R.M. Kebeasy and A.A. Gharib, 1991. Active fault and water loading are important factors in triggering earthquake activity around Aswan Lake. *Journal of Geodynamics* 14(1-4): 73-85.

Aswan Lake started impounding in 1964 and reached its highest water level before 1991 in 1978, with a capacity of 133.8 km3, thus forming the second largest man-made lake in the world. An earthquake of magnitude 5.3 (Ms) took place on 14 November 1981 along the most active part of the E-W Kalabsha fault beneath the Kalabsha bay (the largest bay of the lake). This earthquake was followed by a tremendous number of smaller events. Argues that active fault and water loading are important factors in triggering earthquake activity around Aswan Lake.

WL Delft Hydraulics, 1991-1994. *Flood Early Warning System.* Sudan.

From WL Delft webpages: "Description: Real-time simulation of the Blue Nile and tributaries, including rainfall-runoff models and an integrated operational flow forecasting system. Training was also provided for the Ministry's engineers." Client/Funder: Ministry of Irrigation and Water Resources, Sudan. WL Ref: Q1012

J.A. Allan, 1992. The changing geography of the Lower Nile: Egypt and Sudan as Riparian states. *The changing geography of Africa and the Middle East*. G. Chapman and K. M. Baker. London, New York, University of London, School of Oriental and African Studies, Department of Geography.

Arcadis Euroconsult, 1992. *Merowe Hydro-Electric Scheme. Feasibility studies regarding the socio-economic and environmental impact.* Sudan.

This report was commissioned by the Government of Sudan/IBRD.

H. M. Ishag, 1992. Effects of Foliar Micronutrient Fertilizers on the Yield of Irrigated Cotton on the Vertisols of the Sudan Gezira. *Experimental Agriculture* 28(3): 265-272.

JICA, 1992. *Hurga and Nur El Din Pump Irrigation Rehabilitation.* Sudan.

Rehabilitation of existing pump irrigation system and crop diversification in semi-arid area. Irrigation: 9,400 ha

S.L. Laki, 1992. *Policy analysis of Sudan's irrigated subsector: the case of Gezira irrigation scheme*. PhD. Thesis. East Lansing, Mich, USA, Department of Agricultural Economics, Michigan State University.

Photocopy. Ann Arbor, Mich.: University Microfilms International, 1994. 22 cm.

Ministry of Irrigation and Water Resources, 1992. Feasibility Study of Marrowy Multi-Purposes Project, vol 2. Khartoum, Sudan.

Monnco, 1992. *Hamdab Hydropower Project.* Sudan.

W.H. Quinn, 1992. A study of Southern Oscillation-related climatic activity for A.D. 622-1900, incorporating Nile River flood data. *El Niño: historical and palaeoclimatic aspects of the southern oscillation*. H. F. Diaz and V. Markgraf. Cambridge, UK, New York ,NY, USA, Cambridge University Press.

T. Tvedt, 1992. The management of water and irrigation: The Blue Nile. *Beyond conflict in the Horn*. M. Doornbos**:** 72-92.

While the article focuses on hydropolitics and water development on the Blue Nile, it also draws attention to the close relationship between water sharing agreements regarding the Blue and the White Niles. Due to the supposed hydrological unity of the river basin the economies along the tributaries have also become interconnected.

Acres International, 1993. *Long Term Power System Planning Study, Main Report.* Sudan.

This report was commissioned by the Republic of Sudan, National Electricity Corporation.

A.Q. Cheeseboro, 1993. *Administration and change in the Gezira scheme and the Sudan: 1938-1970*. East Lansing, Mich, USA, Dept. of History, Michigan State University.

F.M. Deng, 1993. Northern and southern Sudan: the Nile. *Culture and negotiation: the resolution of water disputes*. G. Faure and J. Z. Rubin. Newbury Park, Calif., SAGE Publications.

International Symposium on High Aswan Dam Vital Achievements - Fully Controlled, 1993. Cairo, Egypt, Egyptian National Committee on Large Dams.

International Commission on Large Dams. Executive Meeting (61st :1993 Cairo, Egypt) Egyptian

National Committee on Large Dams.

Monenco Consultants Limited, 1993. *Merowe Multi-Purpose Hydro Project: Main Report.* Sudan.

E. H. Osman, 1993. *Optimal operation of a reservoir during a dry season*. Ph.D. Thesis. Newcastle, UK, University of Newcastle-upon-Tyne.

R.G. Bailey, 1994. Guide to the Fishes of the River Nile in the Republic of the Sudan. *Journal of Natural History* 28(4): 937-970.

Descriptions and keys for the identification of 115 species of fish recorded in the basin of the River Nile in the Republic of the Sudan are presented, together with notes on the distribution and ecology of species.

Hydroproject, 1994. *Merowe Dam Project.*Sudan.

The Merowe Project (Hamdab) is located on the Nile River in the Northern Province of the Republic of the Sudan 30 km east of Karima at absolute elevations 250-300 m . This report was commissioned by the Ministry of Irrigation and Water Resources jointly with National Electric Corporation of the Republic of Sudan. Main Data: Rockfill dam maximum height 65.0 m crest length 8 844 m volume 13 916 thou.m3 Spillway capacity 18 400 m3/s Turbine type Francis Installed capacity (10x127.29MW) 1272.9 MW Discharge (10x290) 2900 m3/s Rated net head 45.5 m Average annual output 900 GWh Services: DPR, site investigation Client: Ministry of Irrigation and Water Resources jointly with National Electric Corporation of the Republic of Sudan.

S.L. Laki, 1994. Comparative advantage for Gezira irrigation scheme crops. *Discovery and Innovation* 6(3): 319-325.

Examines comparative advantage in the production of crops in the Gezira Irrigation Scheme and suggests a theoretical framework for the analysis of crop profitability as well as present domestic resource cost (DRC) ratios. These ratios were used to determine Sudan's comparative advantage in the production of medium-staple cotton, long-staple cotton, wheat, groundnuts and sorghum in the Gezira for the 1989/90 cropping season.

J. Meyer-Lassen, A.A. Daffalla and H. Madsen, 1994. Evaluation of focal molluscicide in the Rahad Irrigation Scheme, Sudan. *Acta Tropica* 58(3-4; Dec): 229-41.

M. Woube, 1994. Environmental degradation along the Blue Nile River Basin. *AMBIO* 23(8): 519-520.

Hanan Ali Abdel-Kader, 1995. *Optimizing the conjunctive use of surface and*

groundwater with application to the Nile River aquifer. Fort Collins, Colo, USA, Dept. of Civil Engineering, Colorado State University.

V. Bernal, 1995. Cotton and colonial order in Sudan: A social history with emphasis on the Gezira scheme. *Cotton, colonialism and social history in Sub-Saharan Africa*. R. Roberts and A. Isaacman. Portsmouth, UK, Heinemann**:** 96-118.

F. Bicciato and P. Faggi, 1995. Gezira Schemes between State and Market: Some Remarks on Privatization of Irrigation in Sudan. *GeoJournal* 37(1): 101.

L.P. Brock, 1995. Nile Flood Protection. *Archaeology* 48(3): 22.

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P.P. Howell, J.A. Allan and H. Turral, 1995. The Nile: Sharing a Scarce Resource. A Historical and Technical Review of Water Management and of Economic and Legal Issues. *Development Policy Review* 13(4): 436.

S.M.N. Moalla and I.D. Pulford, 1995. Mobility of metals in Egyptian desert soils subject to inundation by Lake Nasser. *Soil Use and Management* 11(2): 94.

H.N. Srivastava, S.N. Bhattacharya, K.C. Sinha Ray, S.M. Mahmoud and S. Yunga, 1995. Reservoir-Associated Characteristics Using Deterministic Chaos in Aswan, Nurek and Koyna Reservoirs. *Pure and Applied Geophysics* 145(1): 209-217.

A. S. Piotrovskii, 1996. Surveys at the Merowe hydro development in the Sudan for a reliable substantiation of the project: Engineering-geologic conditions and characteristics of the method of investigations. *Power Technology and Engineering (formerly Hydrotechnical Construction)* 30(12): 719-723.

Mohamed Abdel-Gadir Adam, 1996. *The policy impacts on farmers' production and resource use in the irrigated scheme of Gezira, Sudan: A case of change from a controlled subsidised system to a free market mode of production*. Köln, Germany, Wissenschaftsverlag Vauk.

S.E. Ahmed, 1996. Release policies for multipurpose reservoirs during different climatic fluctuations. *Water International* 21(2 (June)): 93-99.

This article evaluates the impact of climatic fluctuations on the water supply and demand of the Blue Nile reservoir system (Roseires and Sennar). Three scenarios are analysed. The first reflects the actual climate and operating conditions. The second scenario shows the impact of different generated climatic fluctuations under the actual operating conditions. In the third scenario, alternate management policies are proposed in an attempt to reduce the impact of shortages on the system.

H. Bakheit, 1996. Regulations plans of the Upper Nile Basin. *Comprehensive Water Resources Development of the Nile Basin: Action Plan. Développement Intégré Des Resources En Eau Du Basin Du Nil: Plan D'Action. Proceedings of the IVth Nile 2002 Conference, International Conference Center, Kampala, Uganda, 26 - 29 February 1996*. A. Mugisha, N. H. Kayondo, E. Dribidu and F. E. Gamal**:** F-39 - F-53.

Y.M. Dafalla, 1996. Reliability of rainfall for crop production in the Sudan. *Comprehensive Water Resources Development of the Nile Basin: Action Plan. Développement Intégré Des Resources En Eau Du Basin Du Nil: Plan D'Action. Proceedings of the IVth Nile 2002 Conference, International Conference Center, Kampala, Uganda, 26 - 29 February 1996*. A. Mugisha, N. H. Kayondo, E. Dribidu and F. E. Gamal**:** I-98.

P. P. Howell, J. A. Allan and J. S. G. McCulloch, 1996. The Nile: Sharing a Scarce Resource. *Journal of Hydrology* 176(1-4): 294.

Hydroproject, 1996. *Kajbar HPP, Sudan.* Sudan.

Location: Kajbar project is located on the Nile River in the Northern province in the Republic of Sudan downstream from the Merowe HPP at the absolute elevations of 190-215 m. This report was commissioned by the Kajbar Hydroelectric Power Company, Sudan. Main Data: Concrete gravity dam: maximum height 18.0 m crest length 1596 m Spillway capacity 15300 m3/s Turbine type Kaplan Installed capacity (6x18.1 MW) 108.6 MW Discharge (6 x 209) 1254 m3/s Rated net head 10.0 m Average annual output 726 GWth. Services: DPR, site investigations.

M.E. Ibrahim and M.K. Salih, 1996. Groundwater Resources of Sudan Development Potential. *Comprehensive Water Resources Development of the Nile Basin: Action Plan.*

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S.A. Ibrahim, 1996. Stochastic Models for Simulation of Annual Flows of the Intermittent Streams of the Sudan. *Comprehensive Water Resources Development of the Nile Basin: Action Plan. Développement Intégré Des Resources En Eau Du Basin Du Nil: Plan D'Action. Proceedings of the IVth Nile 2002 Conference, International Conference Center, Kampala, Uganda, 26 - 29 February 1996*. A. Mugisha, N. H. Kayondo, E. Dribidu and F. E. Gamal**:** I-29 - I-45.

M. Motassem, 1996. The correlation between the River Nile monitoring and Development. *Comprehensive Water Resources Development of the Nile Basin: Action Plan. Développement Intégré Des Resources En Eau Du Basin Du Nil: Plan D'Action. Proceedings of the IVth Nile 2002 Conference, International Conference Center, Kampala, Uganda, 26 - 29 February 1996*. A. Mugisha, N. H. Kayondo, E. Dribidu and F. E. Gamal**:** G-47 - G-58.

M. Shamsul Haque Alvi and Nadir Ahmed Elagib, 1996. Study of hydrology and drought in the flood region of Sudan. *Water International* 21: 76-82.

The hydrologic data that were used in the study include temperature, precipitation, sunshine duration, radiation, humidity, wind speed, and evaporation. The investigation also includes the stream flow records of the Nile River in the region. The study indicates significant changes in the hydrological behaviour of the region characterized by an increase in temperature levels and a substantial reduction in rainfall and river flows.

Sir Alexander Gibb & Partners & Coyne et Bellier, 1996. *Physical Characteristics of Siltation of the Roseires Dam Reservior.* Sudan.

This report was commissioned by the Ministry of Irrigation and Water Resources.

Mohd A. Ali, Omar A. Rahama, Mutasim E. Ali and Mamou I. Dawelbeit, 1997. On-farm Evaluation of Combine Harvester Losses in the Gezira Scheme in the Sudan. *Agricultural Mechanization in Asia, Africa and Latin America* 28(2): 23.

V. Bernal, 1997. Colonial moral economy and the discipline of development: The Gezira Scheme and "modern" Sudan. *Cultural Anthropology* 12(4): 447-479.

S.M. Farah, A.A. Salih, A.M. Taha, Z.I. Ali and I.A. Ali, 1997. Grain sorghum response to supplementary irrigations under post-rainy season conditions. *Agricultural Water Management* 33(1): 31-41.

M.W. Köhnke, 1997. *Beitrag zur Dürrerisiko- Abschätzung in der Nördlichen Gezira-Ebene (Sudan)*. Berlin, Germany Selbstverlag Fachbereich Geowissenschaften FU Berlin.

D.E. Mills, 1997. *Dividing the Nile: The failure to strengthen Egyptian-Sudanese economic bonds, 1918-1945*. Salt Lake City, Utah, USA, Dept. of History, University of Utah.

S.M.N. Moalla, 1997. Physical fractionation of trace and rare earth elements in the sediments of Lake Nasser. *Talanta* 45(1): 213.

Arif Gamal, 1998. Deconstructing Nubia: Kajabar dams entire ancient culture. *World Rivers Review* 13(5): 6-7, 11.

N. Ghezae, 1998. *Irrigation Water Management. A Performance Study of the Rahad Scheme in Sudan, 1977-1996*. Uppsala, Sweden, Department of Economic History, Uppsala University.

The central objective of this study was to assess the performance of irrigation water management of the Rahad scheme in Sudan between 1977 and 1996. The study assesses how well the scheme has succeeded in achieving irrigation management objectives using the criteria for productivity, equity, cost recovery and environmental stability. Findings indicate that scheme performance was below expectations. There were untimely and unreliable water delivery, inequitable water distribution, yields of field crops below expected potential, low level of water charges and recovery rates, and environmental sustainability problems. The study also pointed to fundamental problems in the co-ordination between the different activities and in the allocation of duties and responsibilities between the farmers and the officials and within the official organization. Furthermore lack of operational procedures, low motivation, inadequate skills, and lack of finance were contributing factors.

C.A. Guvele, 1998. *The dynamics of irrigation water use in the Sudan Gezira*. Manhattem Kansas, USA, Kansas State University.

Ahmed Salih, H.M. Babikir and S.A.M. Ali, 1998. Preliminary observations on effects of tillage systems on soil physical properties, cotton root growth and yield in Gezira Scheme, Sudan. *Soil & Tillage Research* 46(3-4): 187-191.

Huda Adelwahab Sharawi, 1998. *Socioeconomic evaluation of land-use alternatives in the Blue Nile flood basin of the Sudan*. Helsinki, Finland, University of Helsinki, Department of Forest Ecology.

Hydroproject, 1998-1999. *Shereiq HPP, Sudan.* Sudan.

Location: Shereiq HPP is planned to be located on the Nile River 4 km to the south of the Shereiq township in the Republic of the Sudan at absolute elevation within 300-345 m. This report was commissioned by the River Nile State Electricity Company of the Republic of the Sudan. Main Data: Earthfill dam maximum height 45 m crest length 3069 m volume 2979 thou.m3 Spillway capacity 19900 m3/s Turbine type Kaplan Installed capacity (6x52.5MWт) 315 MW Rated net head 18.0 m Average annual output 1630 GWhт Services: Feasibility Study DPR site investigation.

Government of Sudan, 1999. Sudan Water Resources Policy. Khartoum, Sudan.

WL Delft Hydraulics, 2000. *Upgrading FEWS Sudan (Flood Early Warning System).* Sudan.

From WL Delft webpages: "Description: On request of the Ministry of Irrigation and Water Resources in Sudan, a fact finding mission is carried out to assess the necessary activities to upgrade the present FEWS for the Nile river in Sudan. The original system was implemented by WL Delft Hydraulics in the period 1991-1994. " This report was commissioned by the UNDP Khartoum WL Ref: Q2704

J. Kirkby, 2001. Saving the Gash Delta, Sudan. *Land Degradation & Development* 12(3): 225-236.

This article looks at a seasonal river flooded irrigation system in eastern Sudan called the Gash Delta. The Gash Delta, as an irrigation system, has been managed since the 1900s, firstly by the Anglo-Egyptian colonial administration and currently by the Gash Delta Agricultural Corporation (GDAC). The Gash Delta supports a range of ethnic groups who have a diversity of production strategies, some of which are more successful than others. Since the 1980s, there has been a recognition of a breakdown of the irrigation system, illustrated by the declining surface areas available for agriculture and a general degradation of the physical production base. This has had negative impacts on the ethnic groups who rely on the Gash Delta for subsistence and livelihood. This paper examines the process of degradation and the looks at the possibility of rehabilitating the Gash Delta.

Ministry of Irrigation and Water Resources, 2003. Report on Flushing operation of Khashm El Girba Reservior. Khartoum, Sudan.

T. Terje Tvedt, 2004. *River Nile in the Age of the British: Political Ecology and the Quest for Economic Power*.

Deals in empirical detail with the history of the Sudan in a Nile perspective and discusses at length the Jonglei Project (from 1899-1956), the Sennar Dam and the Gezira Scheme (1920s).

Lahmeyer International, 2005. *Feasibility Study for the Merowe Irrigation Project. Feasibility Report. Annex 2.1. Climate and Hydrology.* Sudan.

This report was commissioned by the Merowe Dam Project Implementation Unit, Found in Library of Hydrology Research Unit, Ministry of Irrigation and Water Resources, Wad Medani From the introduction: The study concerns: 1. A review of earlier studies for the Merowe Dam and lrrigation Projects. 2. Provision of inflow and irrigation demand series required as input to simulate the effects of irrigation abstraction on operation of the Merowe Dam; this involved a review of flow and demand series previously collected and their updating based on more recently recorded water level and flow information, future agricultural demands and future water development scenarios. 3. Collection and review of climatological data for the project area, particularly with a view to confirming the accuracy of crop water requirements derived in earlier studies. 4. Estimation of design flood discharges at those locations where the proposed canals will cross both major and minor wadis.

WL Delft Hydraulics, 2005. *Merowe Dam - Review of Hydraulic Model Studies and Design.*Sudan.

From Delft Hydraulics website: "The Merowe Dam Project Implementation Unit, Republic of The Sudan commissioned WL Delft Hydraulics to Review the hydraulic model studies and design changes of the Merowe Dam executed by the Institut für Wasserbau of Innsbruck University." The report was commissioned by the Ministry of Irrigation and Hydropower, Sudan. WL Ref: Q4102

Norplan, 2006. *Fula Rapids Feasibility Study, Phase 1.* Sudan.

This report was commissioned by the Norwegian Investment Fund for Developing Countries (NORFUND). It deals with a project proposed in a 25 year old Feasibility Study, describing a potential HPP located on the River Nile just north of the Ugandan border, about 170 km south of Juba. Argues that the study has to be needs to be reviewed and updated. The Fula Rapids create a gross head of about 30 m and presents a potential of about 150 MW installed capacity at the Nile's average flow of 500 - 750 m3/s.

Mahmoud El Zain, 2007. *Environmental Scarcity, Hydropolitics, and the Nile*. PhD. The Hague, The Netherlands, Institute of Social Science.

Electricity Council Overseas Consultancy Services, (n.d.). *Summary of Technical and Organizational Problems at Er Roseires Power Station.* Sudan.

Argues that the silting of the reservoir and intakes is the most serious long-term technical problem facing the station management.

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Tanesco, *Annual Reports 1997, 1998.* Tanzania.

Tanzania Electric Supply Company Limited. Research & Investigation Section, *Mini-Hydropower Inventory in Tanzania.* Tanzania.

Merz McLellan, 1964. *The Power Market in Tanzania.* Tanzania.

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Norconsult A.S. and Electrowatt, 1976. *Kagera River Basin Development, Phase II – Prefeasibility Studies, Kagera River Hydropower Developments, Rusumo Falls Hydropower Project, Kishanda Valley Hydropower Project, Kakono Dam Hydropower Project.* Tanzania.

Norconsult A.S. and Electrowatt, 1976. *Rapport Technique, Volume 2 – Aménagement du Bassinde la Rivière Kagera, Phase II – Burundi, Rwanda, République Unie de la Tanzania – Etude Sectorielle, Evaluation des Projets Existants.* Tanzania.

Norconsult A.S. and Electrowatt, 1976. *Burundi-Rwanda-United Republic of Tanzania, Kagera River Basin Development - Phase II.* Tanzania.

This report was commissioned by the United Nations. RAF-71-147 Sectoral and prefeasibility studies:
vol 1 Power market
vol 2 Evaluation of exisiting project
vol 3 Hydropower potentials of Burundi (including other basins)

vol 4 General agriculture
vol 5 Ecology
vol 6 Human infrastrucure
vol 7 Hydrology
vol 8 Transportation
vol 9 Kagera River Hydro power developments, Rusumo Falls, Kishanda
vol 10 Nakaka livestoch project
vol 11 Kayaka irrigation project
vol 12 Reclamation of Bukumba, Kajaj and Kaskuma v.
vol 13 Indicative basin plan

Norconsult A.S./Electrowatt, 1976. *Rapport Technique, Volume 13 – Aménagement du Bassin de la Rivière Kagera, Phase II – Burundi, Rwanda, République Unie de la Tanzania – Etude Sectorielle, Plan Indicatif du Bassin.* Tanzania.

Ministry of Water United Republic of Tanzania, Energy and Minerals,,, 1976. *Western Tanzania Project, The Hydro-Power and Irrigation Study of Western Tanzania, Report No. 2, Hydro-Power Potentials in Western Tanzania, A report on 52 investigated Rivers.* Dar es Salaam, Tanzania

Tractionel-Electrobel, 1979. *Hydropower Development of Rusumo Falls, B -Agriculture & other implications – B2 – Inventory of the Agriculture Situation.* Tanzania.

This report was commissioned by the Ministère des Affaires Étrangères, du Commerce extérieur et de la Coopération au Développement (Belgique)

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This report was commissioned by the Ministère des Affaires Étrangères, du Commerce extérieur et de la Coopération au Développement (Belgique).

United Nations Development Programme, 1980. *Mineral survey of the Lake Victoria goldfields, United Republic of Tanzania: Final report prepared for the Government of the United Republic of Tanzania*. New York, United Nations.

Photocopy. Ann Arbor, Mich.: University Microfilms, [198-?] 27 cm.

Kagera Basin Organization, 1982. Development Program for the Kagera Basin Final Report, volume 3, Energy.

S. R. Nkonoki, 1983. *Cooperation in Energy Development in Eastern Africa in Reference to the Planning of Rusumo Falls Hydroelectric Project.* UDAS/MOW,

Tanzania.

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Tractionel Electrobel Engineering, 1987. *Rusumo Falls Hydroelectric Scheme, Phase II, Part 1, Technical Feasibility, Volume 1A, Site Survey, Text and Figures, Volume 2, Preliminary Project of Structures and Works.* Tanzania.

This report was commissioned by the Kingdom of Belgium, Administration for Development Cooperation

Arcadis Euroconsult, 1988. *Water resources study for the North Tanzanian plains.* Tanzania.

Tractionel Electrobel Engineering, 1988. *Rusumu Falls Hydroelectric Scheme.* Tanzania.

Food and Agriculture Organization of the United Nations, Agricultural Operations Div., 1991. *Water Resources Management for Sustainable Agriculture in the Equatorial Lakes Sub-Region. Project identification mission. Mission report, July 1991. - pt. 1: Regional and bilateral project formulation frameworks. - pt. 2: Kenya, Project formulation frameworks. - pt. 3: Tanzania, project formulation frameworks. - pt. 4: Uganda, project formulation frameworks.* FAO, Rome, Italy; Tanzania.

Project: Monitoring, Forecasting and Simulation of the River Nile Basin for Agricultural Production, Africa. RAF/8969.

Tractebel Engineering Brussels, 1992. *Rusumo Falls Hydroelectric Scheme, Phase II, Part 3, Additional Geophysical Survey, Final Edition.* Tanzania.

This report was commissioned by the Kagera Basin Organisation.

Tractebel Engineering Brussels, 1992. *Rusumo Falls Hydroelectric Scheme, Phase II, Part 3, Final Design, Volume 2 – Drawings, Final Edition.* Tanzania.

This report was commissioned by the Kagera Basin Organisation.

Tractebel Engineering Brussels, 1992. *Rusumo Falls Hydroelectric Scheme, Phase II, Part 3, Tender Documents, Lot 1-3.* Tanzania.

This report was commissioned by the Kagera Basin Organisation.

Tractebel Engineering Brussels, 1992. *Rusumo Falls Hydroelectric Scheme, Addendum to the Economic Feasibility Study, Organization for the Management and Development of the Kagera River Basin (K.B.O.), Burundi, Rwanda, Tanzania, Uganda.* Tanzania.

Tractebel Ingénierie Bruxelles, 1992. *Aménagement Hydroélectrique des Chutes de Rusumo,Phase II - Volet 3, Avant-projet détaillé, Volume 1 - Texte, Édition définitive, Organisation pour l'Aménagement et le Développement du bassin de la Rivière Kagera (O.B.K.), Burundi, Rwanda, Tanzanie, Uganda.* Tanzania.

Tractionel Engineering, 1992. *Rusumu Falls Hydroelectric Scheme: Executive Summary.* Tanzania.

Prepared for Kagera Basin Organisation

Tractionel Engineering, 1992. *KBO Rusumo Falls Hydroelectric Scheme Phase II Part 3 Tender Documents Lot 3 Volume 1-8.* Brussels, Belgium; Tanzania.

Kagera Basin Organization, 1993. Rusumo Falls Hydroelectric Power Project: Environmental Impact Studies.

This report was commissioned by the Kagera Basin Organization Secretariat.

A. J. Lema, 1993. *Lake Victoria waters in the context of irrigation development in Tanzania*. Dar es Salaam, Tanzania, Institute of Resource Assessment, University of Dar es Salaam.

Tractebel, 1993. *E.G.L. Organisation de la C.E.P.G.L. pour l'énergie des pays des grands lacs, Plan directeur régional de développement de l'énergie, Rapport no 5, Plan directeur régional de l'énergie, Édition finale, Février 1993 SSEA - Final Report F-10 015718-0004-03.* Tanzania.

Tractionel Energy Engineering, 1993. Study on technical and economic justification of the interconnection of networks linked to Rusumo Falls.

Eng. Marcus B.E. Mtuzi, 1994. Factors to be considered in the use of the Lake Victoria waters for the arid areas of Tanzania. *Nile 2002 Conference, February 13-16, 1994. Comprehensive Water Resources Development of the Nile Basin "Taking-off"*.

Programme, poster papers and pre-proceedings.

This paper, prepared by the Ministry of Water, Energy and Minerals in Tanzania, presents briefly some views about the use of water from Lake Victoria ("lying idle for the countries of East Africa and in particular Tanzania which hosts about 60% of the water body") for the arid areas of northern Tanzania. Argues that the Tanzanian government wants to implement the old German plan to lift water from the lake by pumping to River Manonga Plains and then down to Wembere plain where it was to irrigate cotton farms. It was found that about 230 000 hectares of land could be irrigated and the water requirements then stood at around 92 m^3/sec, while now it was 250 m^3/sec due to additional needs. 18 pages.

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The paper argues that the 1929 and 1959 Agreements are no longer useful tools for allocation. The author (Tanzanian) suggests that there is a need to "look afresh" at how the water resources can be equitably utilised.

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