

Issue 6

April 1996

M E W R E W

Middle East and African Water Review

**Water Issues
Group at
SOAS**

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Middle East & African Water Issues

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SEMINAR & LECTURE PROGRAMME

Workshops and seminars are approached from a variety of points of view - environmental, water management including engineering, economic, social, institutional, legal, political & international.

At SOAS or see below. Room to be confirmed on arrival.

13 May 1996 5.00 pm Monday at SOAS Room G58

Extreme water stress: the case of Taiz, Yemen

Chris Handley, Research Graduate, Department of Geography, SOAS

Yemen's second city, Taiz, has faced water supply difficulties since the 1960s. The speaker will explain the hydrological background to past and future problems and will trace the sequence of partial remedies to the supply problem installed since the 1960s. Current studies examining the water resource potential of the region will be discussed. The main purpose of the paper will be to review the responses of Taiz's domestic and industrial users and its government to the restricted availability of water. The suite of private sector responses to water shortages has been studied in detail with respect to quantity and quality. The costs of water provision and the prices charged for it by the various vendors will also be analysed.

20 May 1996 5.00 pm Monday at SOAS Room 116

Sorting out the water rights: a state water management initiative & indigenous water users, Mt Kilimanjaro, Tanzania

Polly Gillingham, Research Graduate, Department of Geography, Cambridge University.
meg11@cus.cam.ac.uk

The Tanzanian drought in the early 1990's resulted in low water levels in the hydroelectric power dams of the Pangani Basin, causing severe power rationing across the country. The most significant rainfall catchment area in the Pangani Basin is Mount Kilimanjaro, where 200 per cent of the total flow of the Pangani river at the power stations is abstracted by indigenous water channels, which have supplied water to the mountain population for over 200 years. The speaker will consider the water management initiatives taken by the state in the Pangani Basin in order to obtain a secure supply of water to the power dams, and the appropriateness of these policies to the top-end users on Kilimanjaro.

4 June 1996 5.00 pm Tuesday at SOAS Room 116

'Hydrostrategic' territory in the Jordan Basin: water, war, and Arab-Israeli peace negotiations

Professor Aaron Wolf, University of Alabama

The paper examines the relationship between the location of water sources and strategic territory along Arab-Israeli boundaries, and poses the question, 'Does territory exist over which sovereignty has been sought politically or militarily, or which would be insisted upon in the course of current territorial negotiations, solely because of its access to water sources, and in the absence of any other compelling strategic or legal rationale?' The question as a whole is divided into three components:

- Have boundaries been drawn historically on the basis of the location of water access?
- During warfare between competing riparians, has territory been explicitly targeted or captured because of its access to water sources?
- In the course of negotiations, has territory with access to water sources, and no other strategic component, been seen vital to retain by any of the riparians?

It is found that questions of water allocations and rights have been difficult components in Arab-Israeli relations, occasionally influencing boundary decisions. Nevertheless, with the concluded negotiations between Israel and Jordan, and the ongoing talks between Israel and the Palestinians, and despite the quantity of studies identifying 'hydrostrategic' territory & advising its retention, NO territory to date has been retained simply because of the location of water. Solutions in each case have focused on creative joint management of the resource, rather than insistence on sovereignty.

Anyone with an interest in water will be welcome but **if you wish to attend please contact:**
Tony Allan at SOAS on Tel: 0171 323 6159, Fax: 071 436 3844, Email: ta1@soas.ac.uk

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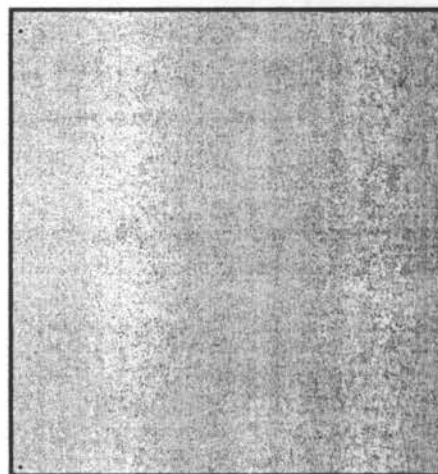
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Khor, M, 1996, *Free trade for whom?*

CERES, 1996, *The gathering wheat crisis: Mid-East may suffer*

International Grains Council, 1996, *Grain market reports*



Networks & Water Studies

FAO, Aquastat - water use for agriculture and rural development

Aquastat is an information system on water in agriculture and rural development. It produces regional analysis and country profiles on water resources development, with emphasis on irrigation and drainage. Address: Chief of Water Resources, Development and Management Service Land and Water Development Division FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy, Fax, 39 6 5225 6275, Email:land-and-water@FAO.org

International Water Resources Association/Association Internationale des Ressources en Eau/Asociacion Internacional de Recursos Hidricos

The IWRA publishes *Water International* with articles on strategic water issues readers as well as studies on water allocation and management. All regions are addressed. It also publishes the calendar of International meetings organised by IWRA. *Water International* is published four times a year.

IWRA, 1101 West Peabody Drive, Urbana, IL 61801-4723, USA.

Intermediate Technology

An NGO promoting and developing cheap small scale and appropriate technical solutions to problems in the developing world. One area IT focuses on is water supply to the poor. A quarterly publication, *Waterlines* promotes IT's work and encourages debate on alternative technologies. One edition focused on **rainwater harvesting** and its possibilities for increasing domestic water availability.

Address: Intermediate Technology 103-105 Southampton Row, London, WC1B 4HH, UK. Email: itpubs@gn.apc.org

Flood Hazard Research Centre Middlesex University

Information and Publications List October 1995, List available from Ms J Difrancesco, Flood Hazard Research Centre, Middlesex University, Queensway, Enfield, Middlesex, EN3 4SF UK.

Durham/Badia Research and Development Programme

Priority research themes and topics: 1996 - 1998 and beyond. The project is researching the natural resources and potential of the arid eastern tracts of Jordan. The aim is to identify general resource management policies and livelihood potentials. The studies are sponsored by the Royal Scientific Society in Jordan and the Royal Geographical Society in London. The research is coordinated in the UK by Dr Roderic Dutton of CORD in the Department of Geography in the University of Durham, DH1 3LE.

Cranfield University: Silsoe College

Prospectus of postgraduate courses, courses available in: Soil and Water Engineering, Irrigation Engineering, Irrigation Water Management, Water Policy and Management, Environmental Water Management and Community Water Supply. Address: Silsoe College, Bedford, MK45 4DT, UK. Tel 00 44 (0)152 586 3291 Fax 152 586 3300.

INWRDAM Inter-Islamic Network on Water Resources Development & Management

Newsletter, issue No.18, April, 1996. Published quarterly by INWRDAM; P O Box 925819, Amman, PC 11110, Jordan, Tel. +962 6 832993, Fax, +962 6 832969, Email:inwrdam@amra.nic.gov.jo

INWRDAM will start a new activity from mid 1996 aimed at publishing a series of specialised scientific and technological monographs and books that deal with water science, technology and applications. This activity is intended to fill the gap of knowledge that presently exists in many OIC countries regarding the technical publications on water related themes.

Funds in support of this activity started to come from some companies that support research and development. Reasonable honoraria will be provided for the authors of these monographs while INWRDAM will be responsible for editing and publication. In 1996-97 three monographs are planned for production, these are:

- a) Water desalination technology;
- b) Water treatment for pollution control;
- c) Industrial wastewater treatment.

'We would like to invite competent scientists and experienced engineers to contact INWRDAM before August 1996 and indicate their desire to participate in this activity and to suggest additional titles that are suitable for the purpose of promoting better applications of water technology among Muslim scientists & engineers. More details about this subject will be published, as it becomes available in forthcoming Newsletters.'

CONFERENCES - FORTHCOMING

Water Policy: allocation and management in practice at Silsoe College, Cranfield University 23/24 September 1996

Aims

To provide a forum for exchange of current experience in water policy development and implementation. Also to examine, in the light of principles and concepts developed over the past decade, successes and failures in the practical integration of all water policy related issues.

Scope

Water resources management; water technology developments; water demand and allocation; water and economics; water rights and legislation; institutions and infrastructure; people, politics and society; policy formulation and implementation.

Target participants

Managers, engineers, scientists, administrators, lawyers, economists, politicians, civil servants, academics, planners and policy makers in water and water related sectors.

If you are interested in participating get in touch with Dr Peter Howsam at Water Management Department, Silsoe College, Bedford, MK45 4DT, UK. Tel 00 44 (0)152 586 3291 Fax 152 586 3300.

Water resources assessment and management strategies for Latin America and the Caribbean.

San Jose, Costa Rica, 6-11 May 1996. Convened by the World Meteorological Office and the Inter-American Development Bank.

Aims

To explore strategies to ensure that national water resources agencies play a full part in regional and national development by:

- Raising awareness of role of water resources and need for adequate knowledge of these resources for the national economies.
- Defining the needs of policy and decision makers for water resources information.
- Promoting national water resources assessment and evaluation of data quality.
- Preparation of resource and management strategies.
- Creating awareness of conservation strategies.

Target participants

Policy- and decision-makers responsible for national water and development policies, managers of water resource projects, heads of agencies responsible for data collection, organisations involved in water activities.

For further information contact; World Meteorological Organisation, Conference on Water Resources, Hydrology and Water Resources Department, 41 Ave Giuseppe Motta, Csae Postale No 2300, CH-1211 Geneva 2, Switzerland.

Email: lacwrcon@www.wmo.ch

Water resources outlook for the 21st century: conflict and opportunities, Ninth world water congress

September 1-6 1997, Montreal, Canada. Organised by the International Water Resources Association, Address: 1101 West Peabody Drive, Urbana, IL 61801-4723, USA.

CONFERENCES - RECENT

INBA, Fourth Nile 2002 Conference Kampala - 26-29 February 1996

The fourth in the series of conferences was held in Kampala, Uganda. Only Eritrea of the 10 Nile countries was absent. Riparians were represented at a senior technical level. There were over 200 participants from 20 countries. The sponsors included The Ministry of Natural Resources, Uganda, CIDA, FAO, DANIDA and the World Bank.

Six keynote papers were presented together with seven country papers and thirty scientific papers or poster papers. Legal matters arising from international treaties received attention. Professor Waterbury discussed some of the implications of basin-wide co-operation and other papers covered equitable sharing, regulation plans for the upper Nile basin and the need for quality monitoring. A study tour visited Port Bell, where water hyacinth impedes navigation, and the Owen Falls dam and extension. See the note on the John Waterbury paper in the reviews section.

Future meetings are due to be held in Ethiopia and Kenya.

Strategic visions for the Middle East and North Africa. A World Bank/ERF sponsored workshop held in Tunisia autumn 1995

It brought together economists, human resource specialists and environmentalists from most countries in the region to discuss major long term issues facing the Middle East and North Africa. Recurrent themes were i) the increasingly tough international environment; ii) uncertainty about how the region would integrate into the world economy and where growth would come from; iii) the enormous shift in thinking about the role of human capital and natural resources in development; iv) the corruption of old institutions and the emergence of more efficient - but inequitable - alternatives; and v) debate about the appropriate pace of change. Brief resumes of the papers presented can be found in *FORUM* Vol. 2, 3, October 1995.

Grain, water and the political decision

International symposium in Cairo organised by the Arab Research Centre - London, Held at the Ministry of Agriculture and Land Reclamation Cairo, 30 and 31 March 1996, Address, ARC, 76/78 Notting Hill Gate, London W11 3HS, Tel. 0171 221 2425. Fax. 0171 221 5899

Subjects addressed were: The Arab World in the global grain market, Recent changes in the world grain market, Water deficits in agriculture in the Arab World and the need to increase water productivity, Grains... a strategic issue between the economic solution and the political decision. The contributors spelled out some of the challenges facing Middle Eastern economies during the coming century in meeting their water needs. Attention was drawn to the achievements in managing indigenous water more carefully. Also to the need to improve water use efficiency in all sectors by improving productive and allocative efficiencies in water use. Emphasis was given to the pivotal role of the Arab economies in the global market in grains. It was suggested that it was important that they co-ordinate their participation in the global grains market to contribute to its stability on which their own economic security depended. Not a new idea but one which deserves urgent consideration.

A paper of particular note is by Ismail-Sabri Abdalla, 'The political economy of food deficits in the Arab region'. This provided a succinct and disturbing review of the history of food import dependence of Middle Eastern economies in the past four decades. He calls for the Arab region to; 'elaborate an integrated and enlightened long term strategy for ensuring a high rate of collective self-sufficiency that would keep food imports in manageable limits'. He argues that market mechanisms could never alone lead to a long term strategy for enhancing Arab food security. 'Political will is badly needed, because positive results cannot show up fully in the lifetime of the decision makers. Alas, the Arab world is more divided than ever before and day to day problems take all the time of political leaders. Solidarity between generations has scarcely guided state decisions, neither in the case of oil and gas nor in that of food security. The challenge of food insecurity to national sovereignty and the well being of the citizens is far from being understood by the public. Therefore there is no build-up of pressure on decision makers. A great deal of scientific research, books and papers have been published but remain up to this moment ignored by the public at large. Raising awareness of the threat of food shortage and the means of developing a strategy for avoiding this threat is a must. All people of good faith should spread the facts and figures that help the public opinion grasp the magnitude and complexity of the issue.'

The meeting provided a chance to revisit the subject of staple food import dependence and was an important initiative in raising awareness of the inescapable relationship between global water and food and balancing Middle Eastern water budgets. The meeting was attended by officials and scientists from Arab countries and by a number of individuals representing international bodies. Mr Germain Denis of the International Grains Council made very important contributions to the discussions and the published papers.

This imaginative and hopefully influential symposium was convened by Mr Abdel Mageed Farid of the Arab Research Centre and sponsored by the Egyptian Ministry of Agriculture and Land Reclamation, the Ministry Public Works and Water Resources and the Ministry of Trade. The respective Ministers contributed to the first session of the symposium. The sponsors and the convenor are to be congratulated for giving attention to the very important theme of the meeting.

MENA - Middle East & North Africa

Pinprick diplomacy

The Economist, 2 September 1995 p 60

Reports on some of the finer points of the Middle East peace process. States that water rights have been given 'permanent status' in the negotiating process. Also reported that Israel's agriculture minister has ceded the principle that Palestinians have some right to the waters that flow beneath the West Bank.

Jordan, Israel, PLO agree on water pact Oslo

AP press release 13-02-96.

'Jordan, Israel and the Palestinians agreed on Tuesday on a framework for sharing their parched regions scant water supplies in hopes of securing Middle East Peace. It is very important because it is the first regional agreement for sharing water that has been accepted', said a Norwegian spokesman. He said the agreement, which outlines principles for sharing water, still requires approval from the three governments. Sharing meagre water supplies is considered one of the keys to a lasting peace in the Middle East, and is also a major issue in separate talks between Israel and Syria.

'Delegations from the three countries opened a quiet meeting in Oslo on Monday (12) in hopes of finalising the agreement which was initiated on Tuesday a spokesperson said. The agreement was intended to outline principles for cooperation on existing supplies, and new sources, such as desalination plants, but would not include detailed water management. Part of the effort includes mapping water resources once a closely guarded secret in the region with the help of the University of Oslo.'

Peres says no Syria deal without accord on water

Reuters press release 13-02-96

'Israel Prime Minister Shimon Peres said today the problem of water rights on the Golan Heights had to be solved for peace to be achieved with Syria. Without a solution to the water problem we will not have any agreement. The solution could be theoretically that Syria would get water from Turkey and we would keep all the water sources under our authority today', Peres said in remarks to students carried on Israeli radio. More than four years of peace talks between the arch foes have snagged over the scope, timing and security arrangements of an Israeli withdrawal from the Golan Heights, captured from Syria in 1967. The Golan, a plateau overlooking northern Israel, is a key water gathering region in the parched Middle East. It is the site he headwaters of the Jordan River.

'Israel has said tributaries flowing from the Golan to the Sea of Galilee, Israel's largest reservoir, provide 30% of its needs and cannot be given up. Even before holding the Golan, Israel used and fought for its water. Arab states in 1964 made an attempt to divert the Jordan's headwaters but in 1965 Israel moved against the preliminary Syrian works, ending the attempted diversion.'

Editor's comment: the figure of 30% for Golan water going to Israel is difficult to substantiate. Assumptions as to what constitutes Golan water needs to be made clear.

Grain drain hits the Middle East

Middle East Economic Digest, 22 March 1996

The Middle East is traditionally an importer of food and is now finding itself at the mercy of high prices on the world cereal market. Prices are 40% higher than for the same period last year.

May saw the beginning of the rise with a slight fall in August after which they soared dramatically. Mid-March this year saw prices stabilise at the \$220 a tonne mark but they are vulnerable to fluctuations.

The poor harvest of 1995 was exacerbated by low carry-over stocks from the previous year because of increased global demand.

The Maghreb is badly affected as it too suffered from drought last year, Morocco's production of wheat falling by 80 per cent and barley down 84 per cent. Wheat imports alone will cost \$600m this year. Iran the regions second largest wheat importer will import 3m tonnes of wheat and 2m tonnes of other cereals but bought all its requirements at the beginning of the year at a discount rate from Canada (saving \$190m). Much of Iran's requirements are not a result of drought - indeed production was up last year - but of waste caused by poor storage.

Turkey and Saudi Arabia will both import wheat this year after being exporters but this is because of changes in agricultural policy. Syria had a good harvest and will import less than 1m tonnes this year.

Bank tries to plug looming water conflict

Financial Times, date mislaid

A new report by the World Bank estimates that \$45bn to \$60bn of investment over the next 10 years could increase available water in the region by 50 per cent. Such comments are unfortunately misleading. While it is possible to deliver substantial increases of water to some sectors, for example to industry and the domestic sector, it is not possible in the major consuming sector, agriculture. It is probable that many economies, especially in the Middle East will reduce their water allocations to irrigated farming. The additional water will certainly be needed and at the global level will be mobilised in the agricultural sectors in humid regions.

The report says that 87 per cent of water is allocated to irrigation and only 13 per cent to municipal and industrial uses, compared to 69 per cent and 31 per cent world-wide. Irrigation efficiency in the region is so poor that, in flood irrigation, only 30% of the water reaches the crops.... A 15 per cent reduction in agricultural use would double the water available to households and industry....

'On urban areas where 50 per cent is wasted, the report targets poor maintenance, inappropriate technology and weak financial management.' The report also blames lack of co-ordination between government bodies and subsidisation of water for the poor performance of the water sector. Privatisation of water services is put forward as an important element in improving efficiency.

Mediterranean states face water crisis; UN report says farming practices must change

Athens Business News, 02 May 1996, in English.

Tel Aviv (Reuters) - Mediterranean countries face severe environmental problems unless they change the way they produce food, the United Nations Food and Agriculture Organisation (FAO) warned yesterday.

'The sustainability of Mediterranean agriculture appears questionable unless urgent and drastic measures are taken to reverse the trend', the FAO said in a document presented to its regional conference for Europe, meeting in Tel Aviv.'

The report and the meeting are useful contributions to the ongoing discourse in which agencies and some governments are attempting to raise the profile of demand management principles.

Libya

Water flows in Qaddafi's Pharaonic project

The Christian Science Monitor 08 January 96.

A useful news item by Thomas Stauffer reporting on the Great Man Made River. Gives a brief explanation to the background of the project, water source, cost and current progress with the second part of the project. The report presents a very upbeat assessment of the scheme. A refreshing contribution attempting to put some numbers on a controversial project which deserves more of the responsible economic analysis such as it receives in this piece. Anti-Libyan media bias is almost universal, despite the enduring and complex connection between the project and the UK based Brown and Root consultants.

Tunisia

Everything is in place for a successful agricultural season

Tunisia News 173 March 16, 1996.

'Water reserves in Tunisia's dams has reached 1.43 bn cubic metres compared with 724m cubic metres during the same period last year according to Mohamed Ben Rejeb, Agriculture Minister. A number of springs that had dried up have started to flow again. The good rains and increased use of fertilisers mean that there should be a significant increase in agricultural production.'

Stepping up the restructuring process

Tunisia News, 173 16 March 1996.

'The council of ministers this week ... was devoted to examining the crucial issue of restructuring state-owned farmland. One of Tunisia's highest objectives: achieving food self-sufficiency by the turn of the century. The restructuring process will involve granting land to private individuals and encouraging exploitation of land under the most favourable of conditions. Banks are to be encouraged to provide loans.'

Southern Africa

'The Mountain Kingdom's white oil: the Lesotho Highlands Water Project'

The Ecologist, Vol. 25 June 1995 pp227-231

This article written by Korinna Horta an economist with the Environmental Defence Fund in Washington DC. is an over view of the negative impact of the Highlands Water Project. Some of the projects background is briefly explained along with how funding was obtained. The article then looks at the social impact of the project on people living in the highlands and covers the issue of compensation. The environmental impact is considered and the fact that during early feasibility studies the issue was largely ignored. The article questions whether the promised 'development' and 'benefits' of the project will materialise and whether they will outweigh other impacts.

Raw water price increase 'Will not have a big effect on household bills'

Business Day, Johannesburg, South Africa, 29 February 96, p.2

A 30 per cent increase in the price of raw water - with unquantified implications for industry - will increase the cost of domestic water by about 10 per cent and raise farming costs up to 3 per cent. Water Affairs Minister Kader Asmal yesterday stressed that the 30% rise was for the supply of raw water for government schemes and was not the increase to be applied to domestic water tariffs.

Outrage as price of water increase

The Star, Johannesburg, 29 February 96, p.3

The increase, which has implications for homes, businesses and the agricultural sector, was the result of a 30 per cent increase in the price of water provided by government water schemes. The increase is part of a long-term project to remove subsidisation from the water pricing structure.

Fears allayed over Katse Dam quakes

Issued by: Department of Water Affairs and Forestry, 22 February 1996

Prof. Kader Asmal, MP, Minister of Water Affairs and Forestry, and senior officials of the Department of Water Affairs and Forestry have evaluated the findings of a technical investigation into the causes and effects of the recent tremors experienced at Mapeleng Village in the vicinity of the Katse Dam in Lesotho.

The technical assessment was commissioned by the Lesotho Highlands Development Authority, (LHDA) the implementing authority for the Lesotho Highlands Water Project (LHWP), in response to the public's concern about tremors experienced at Mapeleng since the commencement of impounding of the Katse Dam late last year.

The assessment was conducted by independent technical experts, Dr Alfred Hendron Jnr and Mr Gary Gibson, who both have wide experience in this field. Dr Henderon is Professor Emeritus of Civil Engineering at the University of Illinois in the United States. Mr Gibson is the Director of the Seismology Research Centre of the Royal Melbourne Institute of Technology in Australia.

The experts have found that the magnitude of the earthquakes induced by the Katse impoundment is not unusual compared with similar events recorded at almost 200 reservoirs world-wide. These events are small and shallow, which is why they have only been felt at Mapeleng. In their view, the opening of a crack along an existing weak zone is only a near surface phenomena. The experts visited the village for on site inspection.

The recent events, according to the two experts, give no cause to change the design of the Katse Dam which is planned to withstand an earthquake measuring 6.5 on the Richter scale. They noted that while the occurrence of a magnitude 4.0 to 4.5 earthquake during the filling of the reservoir cannot be ruled out, since the dam is designed to withstand more than this, there is no technical reason to restrict the filling of the reservoir.

Considering the impact on the villagers of Mapeleng, they have advised the LHDA to provide appropriate temporary housing, or to reinforce existing structures as required because the most likely hazard is local collapse of packed stone and mud walls due to shaking. This recommendation, they say, is not made because the shaking is so intense but because some of the stone walls are only marginally stable.

It is expected that the reservoir-induced micro-earthquake activity will continue as the reservoir level is raised and may continue for some time. The experts have found no evidence to suggest that the whole Mapeleng village or any large rock mass near the reservoir can be expected to slide into the reservoir as happened at Vaiont, Italy, in October 1963.

In the course of the evaluation of the experts' report. Minister Kader Asmal had discussions with Prof. Chris Hartnady of the Department of Geological Sciences at the University of Cape Town. Prof. Hartnady is of the opinion that the recent findings of seismologists ought to be considered when assessing the seismic hazard of the area around the Katse Dam. Minister Asmal invited Prof. Hartnady to submit his opinion in writing for consideration by the Department of Water Affairs and Forestry and the relevant project authorities.

The recommendations of the report by Dr Hendron and Mr Gibson will be implemented by the LHDA.

Enquiries: Mr W S Croucamp, (012) 299-2404

Zimbabwe

Good rains continue

Bulawayo Chronicle, 22 February 96

Good rains fell over most of Zimbabwe in the week preceding 22 February 96. Most towns have sufficient water supply for the next 12 months (exceptions: Chipinge, Beirbridge and Bindura). Rationing in urban areas will not be relaxed because authorities like a two year supply.

City's supply dams gain

Bulawayo Chronicle, 28 February 96

Bulawayo's dams currently holding 159m cubic metres of water representing 39 per cent of capacity. Insiza the largest supply dam is almost at capacity (the last time it was full was 8 years ago). Umaingwane Dam is 73% full, the Lower Ncema Dam is 23.3 per cent full, Upper Ncema Dam is 31 per cent full and the Inyankuni Dam is only 15.5% full. There is no intention of lifting the City's water rations.

Desalination

Sunshine and showers

The Economist, 21 October 95 p138

Norwegian engineer Peter Nylund has developed a cheap, self-contained, solar-powered desalination plant on the Red Sea coast near Massawa Eritrea. Essentially it is a shallow swimming pool covered by greenhouse and a solar powered condenser. A solar powered pump fills the pool to a depth of 10cm. The mid-day temperature in the greenhouse is 110°C producing large volumes of evaporation. The pool is able to produce several thousand litres a day. So far the project has cost \$15,000 paid for by a Norwegian aid agency.

Global water

Global environment

Global Environmental Database - ready and waiting for interrogation!

Entry in *The Globe* April 1996.

The GER Database updating exercise is now complete. The new version contains over 900 entries for UK activities of relevance to a diverse range of GER issues including: climatic change, tropospheric pollution and biodiversity. At the request of the Department of the Environment our coverage of biodiversity has been extended to include activities of relevance to departmental issues, including cross references to major UK resource bases. The database basically describes who is doing what, where, how and why in GER.

Subject classifications: atmosphere (stratosphere and troposphere), marine (shelf and deep-ocean), non-marine hydrology, cryosphere, land use and land cover, climate change (natural and anthropogenic), agriculture and food, forestry, biodiversity (in-situ and ex-situ), other biospheric/biological activities, sustainable use of natural resources, soils, desertification, natural disasters, palaeostudies, human population dynamics, human health, built environment, transport, energy, pollution and waste, alternative technology, economic analysis, international relations and security, and other scientific activities.

From 30 April 1996 copies of either database or subsets of relevance to particular issues (e.g. climate change) will be available on disk in various formats.

• Hard copy reports can be provided in response to specific queries.

• A hard copy summary document will be compiled and distributed in May 1996.

• It is hoped that the database will be accessible over the WWW in the near future.

'The Globe' is published by the UK Global Environmental Research Office, Polaris House, North Star Avenue, Swindon SN2 1EU, UK.

The UK GER Office was established in 1990 by the Research Councils. This was in recognition of the increasing national and international interest in issues relating to global change research. The office acts as a focal point for flow and exchange of information of information, on UK and international science and policy developments.

Swart, R and Bakkes, J (eds), 1995, *Scanning the global environment: a framework and methodology for integrated environmental reporting and assessment*,

Report Carried out on behalf of Research for Man & Environment (RIVM) Netherlands and United Nations Environment Programme (UNEP) Kenya, ISBN 92-807-1491-0

Global Climate Observing System (GCOS)

Newsletter No.4 November 1995. Joint Planning Office, G.L.O.S. c/o World Meteorological Organisation, PO Box 2300 CH-1211 Geneva 2 Switzerland.

Water, water, virtually everywhere

Observer, 07 January 96

Short piece comparing per capita water consumption in various countries and how much is required to sustain a person.

Water water everywhere

New Scientist, 17 February 96 p8

'This is a brief report on the annual meeting of the American Association for the Advancement of Science. Water consumption and population growth were two of the subjects discussed. Gretchen Daily of Stanford University with her colleagues Sandra Postel, director of the Global Water Policy Project in Cambridge Massachusetts, and Paul Ehrlich of Stanford University, have been piecing together information in an attempt to obtain a picture of global water use. They calculated that humans have access to about 12,500 cubic km of freshwater a year, not counting non-renewable groundwater resources.

It was then calculated that humans use 54 per cent of accessible freshwater flowing in rivers and streams. A third of this evaporates during use, the remainder is returned to waterways where it can be reused.

'At projected rates of population growth humans could use more than 70 per cent of freshwater by 2025, assuming that consumption per capita does not rise. In the past few decades per capita consumption has risen steadily which, if this trend continues, means that freshwater supplies could 'conceivably run out during the next century' according to Daily.

'Many assumptions are made in the analysis but the researchers are convinced that their work shows convincingly that present trends of water consumption cannot continue. They also argue that desalination is not a viable alternative because of the high level of energy required. They encourage more efficient water use as the key.'

'Also reported from the same meeting was a study from the International Institute for Applied Systems Analysis in Vienna (IIASA). The study suggests that the World's population will never double again. For the first time there has been a drop in fertility rates in every region of the world.

'The institute's estimate is that World population will grow to 10 billion by 2050, peak at 11 billion by 2075, and remain almost level or even decline slightly towards 2100. The institute

says the declining fertility rates are encouraging with Sub-Saharan Africa starting to catch up in this area of population control. However it is expected that Africa's population will triple before it starts to decline.'

The Economist, 24 February 1996

This article looks at the growing trend at privatising and contracting out water utilities and contracts. The main thrust is to examine why it is so hard to make a profit from water supply when it is '...the ultimate natural monopoly'. Making a profit from supplying water is hard enough in Europe but European companies taking up contracts in developing countries are faced with a many other difficulties. These difficulties are discussed.

Water works in Buenos Aires

The Economist, 24 February 1996

A short article coming after 'water, water, everywhere' to show that it is possible to make profits from water supply. The case study is Buenos Aires and the article looks at the conditions which were conducive to profit creation.

Wheat prices hit 15-year high as EU imposes tax on exports

Financial Times 8 December 1995

The European Commission imposed a tax on wheat exports as world stocks sank to their lowest for 20 years. The shortage of stocks has been caused by drought in the World's main grain exporting countries; the USA, Canada, Australia and South Africa. The EU tax is to reduce exports and therefore keep grain prices within the EU as low as possible.

Wheat price surges to new peak in fast trading, *Financial Times* 25 April 1996.

The Chicago grains market hit a record high on 24 April with the possibility of further rises.

'The outlook is still very uncertain

'The markets will break once we start getting spring wheat crops in, but that is still a long way off.

'Grain prices have been surging for the passed six months when the tightness in world stocks started to become apparent.

Analysts say that stocks have now slipped lower than in the mid 1970s.

'Real prices of agricultural commodities have been falling for the past 40 years - we need a very substantial rise in price if we are going to limit consumption in line with falling supply' said Mr. Steve Strongin, commodities research manager at Goldman Sachs in New York.

Mr. Strongin added that the additional capacity for growing more crops was a lot lower than most people believed. "set aside acreage in the European Union and US is trivial in terms of global demand".

Reviews

Books & theses, papers, reports and databases

THE MIDDLE EAST

Bulloch, John and Darwish, Adel, 1993, *Water wars: coming conflicts in the Middle East*

Victor Gallancz, London, 224 pages, 5 maps, index, 1993.

Hardback: ISBN 0 575 05533 2.

A paperback edition has been published without apparent changes despite the errors noted by many reviewers in the hardback.

The last sentence of a review (MEWREW 1993) of the title when the hardback edition first appeared read: 'The book will mislead those wanting to understand the current water management options and provides no signposts for those wanting to predict the policies of governments and relevant agencies in future.' The comment remains relevant especially in the light of the recent treaty on water between Jordan and Israel (September 1994) and the agreement between the Palestinian Authority in September 1995.

Hayward, John, 1995, *Averting a water crisis in the Middle East and North Africa*, Effective

Financing of Environmentally sustainable development, Third annual World Bank conference on environmentally sustainable development held Washington DC October 4 1995, Washington DC: World Bank. Authors address: ESD: Agriculture and Water Team, The World Bank, 1818 H Street, N.W., Washington DC, 20433, USA.

'Measured by any standards, the water situation in the Middle East and North Africa region (MENA) is precarious. The international press and technical literature constantly remind readers of the water crisis that threatens to choke economic development throughout the region, and local accounts of domestic water shortages, of contaminated groundwater, and of wells running dry are commonplace. Projections of current usage into the next few decades demonstrate conclusively that a water crisis looms and much has been said about how conflicts over scarce water could escalate into 'water wars'. The question remains, however, as to whether the crisis is inevitable or avoidable, whether the region is on a downward spiral to becoming a desert, or whether action can reverse the spiral and break down the 'water barrier'

This paper briefly looks at the current situation in MENA and extrapolates to show that, indeed, without decisive action, the crisis will become a reality. But without doubt the crisis can be averted.'

World Bank, 1995, *Middle East and North Africa environmental strategy: towards sustainable development*. Report No. 13601-MNA, 120pp

Lowi, Miriam, 1995, *Rivers of conflict, rivers of peace*, in *Journal of International Affairs*, summer 1995, 49, 1, pp123-144. Address: Dept Political Science, Trenton State College, Hillwood lakes, CN 4700, Trenton N.J. 08650-4700, USA. The paper provides a useful summary of the historical context based on the well researched and previously published

material. The analysis is updated and takes into account the rapidly evolving water relations of the 1993-94 period.

Starr, Joyce Shira, 1996, *Covenant over Middle Eastern water: key to world survival*, New York: Henry Holt, 115 West 18th Street, New York, NY, 10011, USA, ISBN 0 8050 3019 0, 222 pp.

This is another title that assumes that since the Middle East is short of water the peoples and governments of the region do not have the capacity to cope with the challenge. It reaches this conclusion because the analysis does not address the political economy of water. The majority of the study examines the cultural values of water to the various peoples of the region. The author looks at the 'spiritual value of water set forth in sacred writings and shows how this legacy has shaped the current political terrain.' It is very useful to have an analysis of the sources from which stems the rich religious tradition of the region as they undoubtedly indicate the universal significance of water. Deciding the extent to which traditions determine current individual and communal behaviour over such an issue as water management is a particularly difficult task, however. Meanwhile the author might also have emphasised that the holy books are just as strong on sound management as they are on water entitlements. The timeless prose of the Hadith urging that we 'should cultivate our world as if we would like for ever', could be the motto of any late twentieth century Green Party and should be the basis of current government policy of the all water short economies in the Middle East. Estimating the relevance of historical sources is a challenge but it can make a useful contribution to contemporary discourses.

Egypt

Meyer, Günter, 1994, *Land reclamation & development of new agricultural land in Egypt*, in *Applied geography and development*, Vol 44, pp59-71. Institut für Wissenschaftliche Zusammenarbeit, Landhausstraße 18, D-72074 Tübingen, Germany. Author at: Geography Department, Gutenberg Universität, 6500 Mainz, Germany.

Land reclamation has preoccupied Egyptian water and agricultural interests for centuries. It was a priority activity in the 1960s but proved difficult for a variety of reasons not least because progressively more marginal land was addressed, but mainly because the necessary investment resources could not be mobilised. After a lull in the 1970s the activity was again given priority in the early 1980s. Meyer argues that 'The real breakthrough in the development of new land took place in 1988. Since then, an average of 70 000 hectares of irrigation land has been reclaimed annually.

It was the first time in four decades of Egyptian agricultural planning that governmental planning targets in reclaimed areas were not only achieved but surpassed. The area reclaimed between 1978 and 1991 within the framework of the 'green revolution' therefore expanded to 410 000 hectares.

The private sector is mainly responsible for the most recent development since 1988 in discovering desert cultivation as a new and attractive field of investment. The necessary legal foundation was established in 1981. But then it was more profitable to invest money in Islamic investment companies, as they offered very high dividends and were outside all governmental control. The collapse of this parallel economy, which began to emerge in 1987, cleared the way for the investment of tens of thousands of private investors in the development and cultivation of new agricultural land.'

The article is a preliminary report of a major study. It is well illustrated with very clear maps of land reclamation projects.

Yemen

General Department of Hydrogeology, 1993, *Department of Hydrogeology*, 19 page booklet explaining the activities of the General Department of Hydrogeology. Copies in both English and Arabic. General Department of Hydrogeology, PO Box 297, Al Hurriyah Str. 179, Sana'a, Yemen.

Hanley, Chris, *Water stress in Ta'iz, Yemen* A preliminary report of a study of an extreme case of urban water stress.

Chris Handley is a research graduate at SOAS:
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Ta'iz is situated on the southern, lower plateau of Yemen at the surface water divide between the Red Sea and the Indian Ocean. Average rainfall is bimodal with peaks in April-May and August-September with totals around 600mm. The dry season is from October to March. Records indicate drought periods lasting around 6 years and a slightly declining average in the longer (20 years) term, however reliable continuous records are scarce and of short duration. More significantly in terms of infiltration is the rainfall intensity which has not been monitored previously. This study indicated that during 1995, of 775mm total rainfall 85 per cent occurred during 25 events totalling 12 hours duration. Steep valleys to the south direct significant runoff towards the city. The convective nature of the rainfall results in a very variable aerial distribution and in inaccuracies when extrapolating to the whole catchment. The second cause is the infiltration capacity of the ground surface which is extremely high in the case of the terraced slopes and much lower in the areas of rock on the mountain slopes and also in the city environs. Localised high intensity rainfall events can result in severe soil erosion and terrace removal in the upper parts of a catchment and inundation with eroded material in the lower parts.

The rural environment is dominated by rain/spate-fed subsistence farming of sorghum and groundwater irrigation of maize and the mild drug qat as cash crops during the dry season. Some supplementary irrigation occurs in the wet season.

The City of Ta'iz was originally supplied with water for domestic use from perennial springs to the south. A pumped poor quality groundwater supply and distribution scheme was provided by the US during the sixties sourcing the water directly downstream from the city. With further population growth a second scheme in the early eighties exploited a well field in the Al Hayma valley 15km to the north of the city. The valley is underlain by approximately 50m of alluvium below which are volcanics of low fracture porosity. Population increase has been particularly high, rising from 180,000 in 1985 to around 350,000 in 1994. Coupled with a water quality deterioration in the US supply, the increasing demand has led to several emergency drilling programmes. During 1995 the Al Hayma source notably declined in yield essentially due to emptying of the ground water reserves during the previous twelve years. Another emergency drilling programme, this time within the city was undertaken with limited success in water quality or quantity (approximately 10 wells yielding 30 lit/sec of around 2200 uS/cm).

Municipal water supply to the city during 1995 declined to an average of 24 hours connection per month, falling to once per 40 days in July/August. Water quality fell from 1800uS/cm to 3600 uS/cm by the end of the year. Declining water availability necessitated the use of poorer quality supplies such as the US scheme. Many socio-economic ramifications have been manifested in conditions of such acute water stress. A proliferation of private water sellers has occurred in town main fields. The supply of low quality water for washing/toilet purposes by tanker is beyond the financial resources of many. They have resorted to transporting water from various free water points in the city. The second field of supply is that of drinking water in reusable plastic containers, a form affordable to most of the

population. A market of private water-processing and distribution networks have expanded approximately four-fold within the year. On the day that municipal water is supplied domestic water-related activity causes a social activity interruption/imposition akin to a death in the family with a cancellation of all social engagements especially for the female members of the household.

The water stress situation in Ta'iz is particularly informative with respect to many issues currently of interest to those involved in water research.

Prices paid for water vary by nearly five orders of magnitude. Significant capacity for water savings through production efficiency measures are possible in the agricultural industry and domestic sectors. A survey of industrial water supply and disposal indicates great potential for recycling. The factory managers are fully aware of this potential and are researching (quite costly) means of implementing measures. The returns to water in the industrial sector are very significant in terms of profitability and job provision as evidenced by the increase in the industrial proportion of GDP over the past few years and the large slice (41 per cent) of Yemeni industrial employment that Ta'iz accounts for. Agricultural production efficiency enhancement through the change to less water consumptive crops and drought resistant strains have not been explored and awareness dissemination through extensionists is poor. Domestic consumption could be reduced through leak reduction (currently at 40 per cent according to the water authority, and 60 per cent according to outside sources). Although pricing could more closely reflect the willingness-to-pay evidenced by the alternative supply prices this demand control measure would be of limited impact in the short term due to the suppressed demand.

The huge sectoral/use water price variation means that inter-sectoral reallocation potential is high. Allocative efficiency measures from agriculture to municipal and industrial users should be possible because of the presence of willing buyers and potentially willing sellers (if they were made aware of the willingness to pay). However this does not seem possible in the near future due to the absence of an 'honest broker' (in this case the government or its agent) to act as intermediary. The view of the historical rôle of the government as water poacher in the rural areas and incompetent supplier in the cities is demonstrated by a recent confrontation of the national security forces by local farmers.

The area has had a history of development attention which has reached an unparalleled level at present. Supply management measures have dominated however. Drilling projects have been 'emergency' activities. Emergency seems to spell 'aid' and also 'unsustainable'. Although environmental issues are paid lip-service by development organisations and the government, in reality water levels and water quality are declining throughout the area.

Jordan River

Currie, Anthony, 1994, *The changing security environment: an analysis of the politics of water in the Jordan-Yarmuk river basin*, unpublished Masters dissertation, Faculty of Social Sciences University of Bristol, Bristol BS9, UK.

This is a well informed study written for the international relations and politics communities but there is evidence of interdisciplinary aspirations. The author was interested in the economic factors, local and global, which are of such importance in understanding the evolving politics and international relations but was supervised to write an analysis which de-emphasises such explanation. But a very good study.

Jordan

Ghezawi, Ali and Dajani, Hiba, 1995, *Jordan's water sector facts manual*, Amman: Royal Scientific Society, Amman, Jordan. Address: PO Box 925819, Amman, Tel. 962 6 844701, Fax. 962 6 844807.

The booklet provides a very useful guide to the water resources of Jordan. It is particularly helpful in providing an official view on the water resources of the country and approaches to their management.

Haddadin, Munther, 1995, *Water problems in Jordan*, Effective Financing of Environmentally sustainable development, Third annual World Bank conference on environmentally sustainable development held Washington DC October 4 1995, Washington DC: World Bank. Authors Address: P.O. Box 830746, Amman, Jordan.

'Unlike the presentations of many experts that portray the problem in Jordan as that of water shortage, and speak of Jordan as a 'water short' country, this presentation portrays the problem as it really is, with its three components: resource availability and demand, resource economics, and resource management and administration. It is briefly defined in the following statement: " Jordan is undergoing a chronic deficit in the population-water resources equation, and the deficit is increasing with time because of increase in population, improvements in their living standards leading to higher water demands on the one side, and losses in its water stock because of quality degradation and erosion in its rightful water share of international waters on the other. The current and marginal cost of water is beyond the ability of the average consumer to afford, and cost recovery remains an unattainable objective. The problem is directly impacted by the regimes of water management and administration, and by the economic growth rates and income distribution patterns".

Schiffler Manuel, Koppen Hans, Lohmann Renate, Schmidt, Alexandra, Wachter, Annette and Widmann, Christian, 1994, *Water demand management in an Arid Country: the case of Jordan with special reference to industry*, Berlin: German Development Institute, Reports and Working Papers 10/1994, ISBN 3-88985-123-1, 54p, German Development Institute, Hallerstr.3, D-10587 Berlin.

This useful publication should have been reviewed over a year ago but was missed in the midst of other pressures. The study is a courageous attempt to apply economic analysis to a sector which was at the time of the study very unwilling to listen to economic arguments based on principles such as 'allocative efficiency', 'returns to water', 'intersectoral water allocation' and the 'demand management' of water. The review of water use efficiency in a range of uses in Jordan is clearly presented and the conclusions make a valuable if challenging contribution to the discourse on water management in Jordan. The ideas are in fact being rapidly assimilated in Amman. Manuel Schiffler gave a well received seminar at SOAS in October 1995. see our Web Page: <http://www.soas.ac.uk/geography/waterissues/>

Israel

Arad, V and Bartov, Y, 1995, *Geological and water resources bibliography: Samaria area*, Jerusalem: Ministry of Energy and Infrastructure Geological Survey of Israel, Address: 30 Malkhe Israel Street, 95501 Jerusalem, Israel, Tel. 02 314211, Fax. 927 2 380688

Arad, V and Bartov, Y, 1996, *Greater Jerusalem bibliography of geological research*, Jerusalem: Ministry of Energy and Infrastructure Geological Survey of Israel Jerusalem, Israel.

Water and peace

Feitelson, Eran and Haddad, Marwan, 1995, *Joint management of shared aquifers: Final report*

Jerusalem: Harry S Truman Research Institute and the Palestine Consultancy Group, 36pp, ISBN 965 222 684 X, Harry S Truman Research Institute for the Advancement of Peace, The Hebrew University of Jerusalem, Mount Scopus, Jerusalem 91905, Israel. Email: MSTRUMAN@PLUTO.MSCC.HUJI.AC.IL Palestine Consultancy Group, PO Box 19322, 16 Salah Eddin Street, East Jerusalem.

Workshops held in Cyprus and Jerusalem in 1994 and 1995 attended by scientists and professionals concerned with water in Israel and the Palestinian territories enabled very significant levels of discussion on water allocation and management options. The papers focused on groundwater and on the West Bank (Mountain) Aquifer. The proceedings of the workshops (previously reviewed) are of exceptional value to anyone wanting insights into the water management and institutional challenges facing those addressing groundwater in the area to the west of the River Jordan. They are also very useful in bringing together the ideas of a very diverse group of international scientists - engineers, environmental scientists, economists, lawyers, politics and international relations specialists. Their papers and discussion may have had some influence on the peace negotiations. The final report is an attempt to set out approaches acceptable to the convening scientists and participants from Palestine and Israel. The recommendations were drafted with the political realities of developing regional relations in mind.

Mattera, Olga, 1995, *Guerra dell'acqua' e controllo del Giordano*, in *Rivista Italiana Di Geopolitica*, Sommario No.4 1995, Israele Terra E Pace, pp103-116

A useful review of the politics and international relations of the Jordan catchment countries.

Desalination & civil engineering

Lennox, Frank and Stauffer, Thomas, 1995, *Optimal system configuration for power and desalination*, in Proceedings of the IDA World Congress on Desalination and Water Sciences, Abu Dhabi: International Desalination Association.

The need for a comprehensive economic review of desalination is urgently needed in that there are so many that have complex interests in promoting desalination as a solution to water deficits. Researcher scientists and engineers relish the challenge, manufacturers anticipate the commercial returns, politicians need solutions which can easily be realised in prestigious enterprises which obscure real costs in the bewildering world of shadow pricing and exchange rates. The authors have attempted to present some principles and practice for the common conjunction of power generation and desalination.

Roberts, Gwilym M and Fowler, David, 1995, *Built by Oil*, Reading: Ithaca/Garnet Publishing. ISBN 0 86372 189 38. Garnet Publishing Ltd, Southern Court, South St, Reading RG1 4QS, UK. Fax 0173 459 7356.

Oil revenues impacted all the Middle Eastern economies directly or indirectly. The oil exporters were the most transformed but the economies of Jordan and Egypt were also significantly affected through interaction with the oil rich economies of the Gulf. There were periods in the early 1980s when the biggest contribution to the Egyptian economy came from remittances from the Gulf. The urban and industrial landscapes of the region have been experienced unprecedented development and the results, whether the wonderful architectural feasts of the Gulf or the impressive and massive housing schemes of Cairo, or the essential, though invisible, water treatment projects, are impressive. The author, a British engineer, has for decades played a role in the concepts, the design and the implementation of structures throughout the Middle East and presents a very readable account of the impressive bringing together of expertise, enthusiasm and resources. The book would be useful to anyone needing a perspective on the civil works during a period of extraordinary vigour. For those interested in water management there are useful sections on such schemes, notably the Cairo Waste Water Project.

AFRICA

General

World Resources Institute, *Africa data sampler user's guide: a geo-referenced database for all African countries*

World Resources Institute in collaboration with World Conservation Monitoring Centre and PADCO INC. 49pp plus appendices. ISBN 1-56973-035-0 World Resources Institute, 1709 New York Avenue, NW Washington DC 20006, USA. 202 638 6300

A useful database with the capacity to display information in tabular and in map form. The material has already been licensed for use in a number of digital encyclopaedias and educational databases. It is recommended for educational and general use.

University of Newcastle (Department of Agricultural and Environmental Science), *Evaluation and promotion of rainwater harvesting in semi-arid areas*, papers published/presented October 1995, Address: Faculty of Agriculture and Biological Sciences, University of Newcastle, Newcastle upon Tyne, NE1 7RU. Tel. 0191 222 6601, Fax. 0191 222 5228, Email: aes@ncl.ac.uk

World Meteorological Organisation, 1995, *African conference on water resources: policy and assessment*, Report of the conference held 20-25 March 1995 in Addis Ababa Ethiopia. 31pp plus list of participants.

'An African water resources assessment strategy was prepared by the WHO/UNECA conference on water resources: policy and assessment, which was held in Addis Ababa ... and attended by senior representatives of water resources agencies from the African region.

The objective of the conference was to prepare a strategy to rehabilitate, build and /or adapt the institutional, financial manpower and technical capacity of the relevant services of the countries and regional bodies concerned. The purpose of the strategy is to enable them to assess water resources within the context of the integrated and comprehensive development and management of water resources for socio-economic development on a sustainable basis.

The strategic actions recommended by this conference are in the areas of management capacity building, promotion and creation of awareness of the capacity of the hydrological services

and the value of hydrological data, attainment of sustainable financial capacity, integrated water management, regional and sub-regional initiatives and responses, and a new rôle for external support agencies.'

Irrigation

Food and Agricultural Organisation, 1995, *Irrigation in Africa in figures*, Rome: Food and Agricultural Organisation of the United Nations, ISBN 92-5-003727-9, 336pp

The 53 African Countries have been grouped into seven regions on a basis of geographic and climatic homogeneity. These factors have a direct influence on irrigation. These regions are referred to as the Northern, the Sudano-Sahelian, the Gulf of Guinea, Central, Eastern, Indian Ocean Islands and Southern. An example of the data available:

Regional distribution of water resources

Region	Area 000km ²	Precip. km ³ /yr	internal renewable resources			
			km ³ /yr	mm/yr	%of total	% of precip
Northern	5 735	411	50	8.7	1.2	12.2
Sudano-Sahelian	8 591	2 878	170	19.8	4.3	5.9
Gulf of Guinea	2 106	2 965	952	452.0	23.8	32.1
Central	5 329	7 621	1 946	365.2	48.8	25.5
Eastern	2 916	2 364	259	88.8	6.5	11.0
I.O.Islands	591	1 005	340	575.3	8.5	33.8
Southern	4 739	2 967	274	57.8	6.9	9.2
Total	30 025	20 211	3 991	132.9	100.0	19.7

Alemu, Senai, 1995, *The Nile basin: data review and riparian issues*,

Final report and appendix for AGRPW, Washington DC: World Bank, 68 pp. No detailed information on provenance. Including four appendixes, App. 1. *General data on population, Nile flows and water use patterns*, 9 pp. App. 2 *Previous treaties on the Nile Basin*, 28 pp. App. 3 *The dynamics of riparian positions on key Nile Basin issues*, 10 pp. App. 4 *Brief account of legal aspects* including a review of the factors relevant to equitable and reasonable utilization, 4 pp.

The numerous scientists and professionals requiring a broad overview of relevant information on the Nile would benefit immensely from gaining access to this summary. It brings together a data and information ranging from hydrology [the author is an hydrologist], to treaties, the dynamics of the riparians' positions and commentary on some recent suggestions on water sharing. The work reflects comprehensive professionalism with evidence of that the author's hydrological expertise has been strengthened through discussion with legal experts such as Caponera, and economists such as Whittington. As a result he is able to draw attention to the possible win-win outcomes that could emerge with the development of Ethiopia's hydro-power potential. (p 61)

The author states, 'This report is nothing more than an in-house working paper/document to serve as a take-off step after more detailed and comprehensive studies may be undertaken. It is assumed that the future roles of the World Bank and donor agencies to promote basin-wide regional cooperation would be more defined in such studies'. The skill of the author working in very good company has generated a report which certainly provides a fine start and makes a very useful contribution.

By the same author:

Alemu, Senai, 1995, *Problem definition and stakeholder analysis of the Nile basin*

A paper at the 3rd Annual Nile 2002 Conference held at Arusha, Tanzania Feb. 1995.

The Nile

Waterbury John, 1996, *Socio-economic development models for the Nile Basin*

Key note Paper at Fourth Nile 2002 Conference, Kampala 26-29 February 1996

The author takes another look at arguments for cooperation in the Nile Basin which remain a clear research priority. There are many agencies and governments that would value reliable predictions on the hydro-politics of the upper Nile tributaries. Both super-power and Horn of Africa international relations have changed very significantly since 1990. It is concluded that '[a]s we approach the 21st century there are a number of factors that should make cooperation among Nile riparians and integrated development of the basin more feasible than ever before. We have the cumulative lessons of efforts undertaken in the basin itself and elsewhere, great advances in computer modelling and simulation, a better grasp of the resource inventories involved, sophisticated monitoring capabilities, especially through satellite imaging, and well-tested macro and micro-economic tools for carrying out essential cost-benefit analysis.'

'By contrast, there are a number of factors that render our task more difficult. Economic growth in several of the basin's states has been modest or even negative. Climate appears to have led to greater variation in rainfall and perhaps to a secular decline in portions of the basin. Populations are everywhere growing rapidly and generating a steadily-rising demand for food and other agricultural commodities. Cooperation and integrated development is not costless and some governments in the region, faced with the immediate needs of poor populations, may defer the cost of cooperation to an indeterminate future.'

The publication of the author's current extended research in Ethiopia is awaited with interest.

Southern Africa

Water resources management in southern Africa: a vision for the future, Conference of SADC Ministers Responsible for Water Resources Management, Pretoria 23 & 24 November 1995.

Conference co-ordinator: Peter van Niekerk-Chief Engineer, Project Planning, Department of Water Affairs and Forestry, Private Bag X313, Pretoria 0001, RSA.

de Jager, Salome, 1996, *The management of international watercourse systems as reflected by international law and in view of the Southern African Development*

Community, Paper prepared while attached to SOAS's Law Department and Geography Department. Available from Professor J A Allan, SOAS, London WC1H 0XG, Fax 00 44 171 436 844, Email ta1@soas.ac.uk Ms S de Jager, Legal Department, Department of Water Affairs & Forestry, Private Box X313, Pretoria 0001, RSA.

The paper addresses the legal regimes relevant to the riparians of southern African rivers. It also discusses the political economy of water and the realities of water deficits and the solutions which will lie in internationally available 'virtual water'. A useful specialist study with a clear interdisciplinary framework.

Conley, A H, 1995, **A synoptic view of water resources in Southern Africa**. Paper delivered to SAFER Symposium Zimbabwe November 1995. Address: A H Conley, Chief Engineer: Strategic Planning, Department of Water Affairs and Forestry, Private Box X313, Pretoria 0001, RSA. Email: ahconley@dwaf-pta.pwv.gov.za

This paper reviews the vast variation in water availability and development across the watershed areas of southern Africa. Natural conditions range from semi-arid in the south-east to abundant towards the equator, but relative prosperity in the region tends to be inversely proportional to water availability. Some observations are made regarding possibilities for enhancing prosperity and reducing the risk of disasters, without compromising the autonomy of the various nations, through trade and other forms of regional water-related collaboration.'

Lesotho Highlands Water Project, Information Document 1992, Published by Laserline, 4 Parklands, Surbiton, Surrey KT5 8EA.

Lesotho Highlands Water Project, Information Document, Volume 2, November 1993

Lesotho Highlands Water Project, Information Document, Volume 3, May 1995

Lesotho Highlands Water Project, Information Pack produced by the Lesotho Highlands Development Authority and Trans-Caledon Tunnel Authority. Pack contains information on the Highlands Water Project and on the water situation in South Africa and the rationale behind the project.

South Africa

Department of Water Affairs and Forestry, **Weekly state of reservoirs** as on 12-02-96. Publication in English and Afrikaans. Contact: Ms P Ras, Fax No: (012) 326 1780 / 323 4472

South African National Committee on Large Dams (SANCOLD), 1994, **Large Dams and Water Systems in South Africa**, Pretoria: J P van der Walt and Son (Pty), ISBN 0-620-18538-4, 256pp SANCOLD; PO Box 3404, Pretoria 0001, RSA.

Department of Water Affairs, 1986, **Management of the water resources of the Republic of South Africa**, Pretoria: Department of Water Affairs, ISBN 0-621-11004-3

A useful profile of activities of ten years ago.

Drummond, J H, 1990, **Rural land use and Agricultural production in Dinokana village, Bophuthatswana**, in *Geojournal*, Vol.23,3 pp335-343, Department of Geography, University of Bophuthatswana, P. Bag X2046, Mmabatho 8681, RSA.

Drummond, James, 1992, **Changing patterns of land use and agricultural production in Dinokana village, Bophuthatswana**.

Unpublished Master of Arts dissertation, University of the Witwatersrand. (See address in previous entry.)

The main aim of this study is to describe and analyse the trajectory of agricultural development at Dinokana village, Bophuthatswana, spanning the years from the mid-nineteenth century to the late 1980s. On the foundations of a favourable physical environment, arable and pastoral production had flourished in the second half of the nineteenth century and continued to develop in the early decades of the present century. This study advances the argument that agriculture, largely based on the cultivation of cash crops and supported by Department of Native Affairs extension efforts, continued to strengthen at Dinokana in the years from 1919 to 1948. With the establishment of the apartheid state, the roots of a process of agricultural decline were in place. Adopting a thematic approach, a multi-causal explanation for the demise of production is offered. In addition the study further highlights the recent history and contemporary position of agriculture in the period of Bantustan 'independence' since 1977. In particular, the impact of two agricultural projects on the village is analysed. Throughout the period under review it is maintained that an understanding of the link between politics and production is essential to uncover the dynamics of social and economic transformation in this rural community. A major conclusion in this research is that an historical perspective is essential to understand the present position of agricultural development in the Bantustans generally and in Dinokana in particular. It is argued that such a perspective should be incorporated in contemporary rural and agricultural development planning.'

Drummond, James and Mason, Andy, 1993, **The rise and demise of African agricultural production in Dinokana village, Bophuthatswana**, in *Canadian Journal of African Studies*, Vol27,3, pp462-479. (See address in previous entry.)

Drummond, J and Vogel, C, 1993, **Dimensions of drought: South African case studies**, in *Geojournal* / Vo 130,1, pp93-98. (See address in previous entry.)

Drummond, J, 1995, **Development and change: irrigation and agricultural production in Dinokana village, North West Province, South Africa**, in Binns, Tony (Ed), *People and environment in Africa*, Chichester: John Wiley and Sons, ISBN 0-471-95100-5. (See address in previous entry.)

Nigeria

Carter, Richard, 1995, **A policy framework for surface water and shallow groundwater allocation, with special reference to the Komadougou Yobe River Basin, Northeast Nigeria**, in *Public Administration and Development*, Vol.15 pp103-120. Available from the author at Silsoe College, Bedford, MK45 4DT, UK. Tel 00 44 (0)152 586 3291 Fax 152 586 3300. email r.carter@silsoe.cranfield.ac.uk

Staff at Silsoe College play an important role in researching the hydrological and engineering features of water resources. This paper addresses water allocation in a region with scarce water resources and rising water use. The paper emphasises the difficulties of developing water allocation policies in these circumstances.

The Hadejia and Jama'are rivers which rise on the Basement Complex of Kano and Bauchi States, and on entering the area underlain by sedimentary rocks, they lose most of their water in their passage through Jigawa, Yobe and Borno to lake Chad.

Water resource developments on the Hadejia branch are now so far advanced that effectively the entire flow is consumed before the confluence, where the river changes name to the Yobe. These developments have taken place in the absence of a coherent, integrated water management policy, either nationally, for the river basin, or at a local level. The Jama'are tributary is so far undeveloped, although this is unlikely to remain so for much longer. In this paper proposals for an analytical framework for water allocation policy in the river basin are made, together with an analysis of the characteristics of the major existing water-using activities. The paper argues, not for a particular water allocation policy, but for clarity and transparency in the development of such policy by the relevant authorities in Nigeria.'

Other regions

Chile

Hearne, Robert and Easter, William, 1995, *Water allocation and water markets; an analysis of gains-from-trade in Chile*, World Bank Technical Paper 315, Washington DC: The World Bank, ISBN 0-8213-3528-6, 74pp.

The progress made in installing water markets in regions of Chile which are facing increasing water deficits has attracted some useful international interest. The attention of the Bank is predictable in that water markets are regarded as potentially useful instruments for shifting users' perceptions so that they take into account the value of water. If water markets can be developed then price signals can gradually be introduced to enable water to find a rational economic role in productive sectors. The study provides useful survey results and analysis from the regions of Chile which have been involved in water markets. The benefits are interesting but one is struck that the volume of water entering such markets is a very tiny proportion of the water being used for economic purposes in arid regions of the country.

'This study has several important implications for other countries faced with water scarcity:

Firstly, there are significant gains-from-trade that can be realised by fostering water markets. These gains occur in both intersectoral trades and trades between farmers

Second, transferable water-use rights are essential for efficient water markets. These rights can be stipulated by volume or by percentage of river or canal flow. But in areas where water supplies are highly variable, it is necessary to agree on how the rights will be altered during times of scarcity.

Third, great care should be exercised in the initial allocation of water-use rights among users in order to make sure that all the rights are not captured by a few individuals. If the water is to be used for irrigation and an equitable distribution of land and water already exists, a good strategy is to distribute water-use rights to the owners of land on which the water is being used.

Fourth, technology such as adjustable gates and institutional arrangements that encourage the formation of active water users' associations can substantially reduce transaction costs and facilitate market trading.

Fifth, the presence of privately held water rights does not necessarily make it more difficult to reach environmental quality objectives for rivers. Water quality regulations need to be established and enforced irrespective of the water allocation system. In Chile, where river valleys are relatively short, the quantity and quality of return flows may be less problematic than in other countries.

Finally, within a decentralised system of water resource management, there is a rôle for water management authorities in

enforcing rights and resolving conflicts. Yet if institutional arrangements are established that allow water users to resolve conflicts among themselves, they can avoid the need for further government intervention.'

USA

Rosegrant, Mark, 1995, *Water transfers in California: potentials and constraints*, in *Water International*, 20.2, pp72-87.

Address: Mark Rosegrant, International Food Policy Research Institute, Washington DC 20036, USA.

Canada

Water data

Canadian water supplies and demands (million cubic metres)

River basin region	current reliable annual flows	1981 with-drawals	1981 con-sumption	2011 with-drawals low estimate	2011 with-drawals high estimate
Pacific Coastal	396,400	2,134	68	2,025	4,398
Fraser-Lower Mainland	96,000	975	219	974	2,047
Okanagan-Similkameen	971	312	148	300	681
Columbia	51,850	305	33	292	654
Yukon	56,950	16	1	33	50
Peace-Athabasca	58,720	251	155	304	585
Lower MacKenzie	192,800	26	2	46	68
Arctic Coast-Islands	186,670	—	—	—	—
Missouri	105	156	38	215	365
North Saskatchewan	5,046	1,405	154	2,041	3,267
South Saskatchewan	4,636	2,578	1,680	2,601	6,056
Assiniboine-Red	497	1,012	207	1,354	2,284
Winnipeg	12,040	143	3	152	312
Lower Sask.-Nelson	34,937	122	25	132	310
Churchill	10,190	1	—	—	—
Keewatin	92,870	1	1	—	—
Northern Ontario	117,700	128	2	120	269
Northern Quebec	404,300	121	9	143	268
Great Lakes	75,780	20,850	567	28,471	46,655
Ottawa	43,840	638	77	626	1,304
St. Lawrence	47,430	3,320	343	3,317	6,774
North Shore-Gaspé	203,000	443	38	394	876
St. John-St. Croix	15,990	892	54	1,164	1,786
Maritime Coastal	65,564	1,736	68	2,238	3,565
Newfoundland- Labrador	217,900	298	14	344	542
CANADA	2,392,186	37,864	3,906	47,736	84,039

Source: The ninth world water congress; the International Water Resources Association, p7, see forthcoming conferences for more details.

United Kingdom

Institute of Hydrology, *Hydrological database and analysis system; HYDATA*, 24pp, from

Institute of Hydrology, Wallingford, Oxfordshire, OX10 8BB, UK.

Save The Children, 1996, *Water tight the impact of water metering on low-income families*, London: Save The Children, ISBN 1-899120-27-0, 46pp. Also available as a summary.

Address: Mary Datchelor House, 17 Grove Lane, London SE5 8RD. Tel. 0171 703 5400 Fax. 0171 708 2508.

Water is a major political issue in the UK. There was a drought in 1995 followed by a dry winter. It is proving to be very difficult to install water demand instruments such as household water metering which will seem strange to those in poor arid countries

where metering is often widespread. The problem in the UK arises because there is difficulty in introducing domestic price bands which are at once socially, economically and politically acceptable. This publication is a very important contribution to the raising the profile of the problem of poor families. The study showed that some groups were paying over six per cent of their income on water. This level far exceeds the three per cent which is gaining currency as an acceptable maximum.

Asia

India

Crow, Ben with Lindquist, Alan and Wilson, David, 1995, *Sharing the Ganges: the politics and technology of river development.*, New Delhi: Sage Publications, M-32, Greater Kailash Market I, New Delhi 110 048, India. ISBN 0-8039-9203-3. 272pp

A concise but well informed analysis of the difficult issues surrounding the international management of the Ganges. The riparians are by no means equally endowed environmentally nor in their respective capacities to develop the shared water resources. The geographical and strategic advantages of India are addressed as well as their effect on the recent history of riparian relations. A cerebral collection of high quality material.

China

Bu, Zhong and Chengshi, Xu, 1996, *Bringing the Yangtze to join the Yellow*, *Ceres* 158 March-April 1996, pp42-44, Rome: FAO.

The Yellow River (China's second longest) has been a source of concern to those living within its flood plain, because it has in the past particularly, burst its banks in devastating fashion. In 1995 the river dried up while to the south the Yangtze caused widespread flooding. The drought that caused the Yellow to dry up was the longest on record although there have been periods of distress in 18 of the years since 1972.

The Yellow serves two major areas; Northwest China a resource rich agricultural belt and the area referred to as North China which is a mixed industrial and farming area including Beijing. In view of the drought and the ever increasing demand placed upon the Yellow's resources a journalist put forward the idea that the Northwest be able to use as much water as it wants and that North China uses water diverted from the Yangtze some 1000km to the south. The cost and magnitude of the project mean that if the idea is considered feasible then it will still be some years away.

The Yellow is presenting engineers with another more immediate problem. The River is the dirtiest in the world, carrying 1.6bn tons of silt a year. This is causing the river bed to rise by an average of 10cm a year. The final 750km of the Rivers passage are between 14m high dikes to protect the surrounding areas. As the river continues to rise the view is that a new river bed will have to be dug to carry the river.

World General

Books

Conac, Françoise, 1995, *Barrages internationaux et coopération*, Paris: Karthala, ISBN 2-86537-587-0, 377pp.

A useful edited volume providing information and analysis on international dams world-wide. It was initiated at the time when dams were being looked at extremely critically by the ecologists, economists and especially by the social science community. The chapters are comprehensive and for the most attempt to provide a balanced perspective.

Short works and papers

Allan, Tony and Ciarli, Stefano, P, 1996, *Le sfide dell'Acqua*, *Politica Internazionale*, XXIII, n. 4-5, pp 207-214

Via del Tritone, 62/b, 00187 Roma, Italy. Fax 39 6 679 7849, email logoi@mix.it & <http://www.mix.it/logoi>

Demonstrates the significance of 'virtual water' in the extremely water short Mediterranean region in allowing economies to balance their water budgets. Emphasises that the political economy of water in the Mediterranean region is subordinate to the global political economy of the trade in food staples.

'Benché la regione abbia bisogno di un volume d'acqua doppio rispetto al '90, essa è in grado di pareggiare il proprio deficit importando "acqua virtuale", contenuta nella produzione cerealicola di Altre regioni.'

Black, Maggie, 1996, *Thirsty cities: water, sanitation and the urban poor*, A WaterAid briefing paper prepared for World Water Day 1996 and for the City Summit-Habitat II, London: WaterAid, ISBN 0-9513466-2-8, 15pp. Address: Prince Consort House, 27-29 Albert Embankment, London, SE1 7UB, UK, Tel. 0171 793 4500, Fax. 0171 793 4545, Email:<http://www.oneworld.org/wateraid/>

'Officially urban populations in the developing world are much better off than rural when it comes to 'safe water' and 'sanitary means of waste disposal'. According to UNDP, 85% of developing countries' urban inhabitants have access to safe water, and 75% access to sanitation - figures 20% and 30% higher than for rural populations. However, according to recent analysis for the 1996 Global Report on Human Settlements, these figures appear to be inflated. They are certainly unrepresentative of the situation in Africa and Asia/Pacific, where - according to the latest figures from WHO/UNICEF - 40% and 38% of urban populations have inadequate means of sanitation.

'Evidence suggests that the proportion of urban residents provided with adequate safe water supplies and sanitation has been heavily over-stated. The inaccuracies partly derive from the variations with which authorities interpret the meaning of 'adequate' - both in regard to water quality and numbers served. Taps with over 1,000 users have been known to qualify, as have communal latrines used by dozens of households and constituting a worse health risk than open-air defecation. These definitional discrepancies contribute to the exaggerated picture of service coverage some governments are inclined to portray.'

'The emergence of the 'brown agenda' indicates that a kindlier view of the city as a habitat to be accommodated rather than demonised is gaining ground. Negative stereotypes about the nature of global urban change are beginning to lose their hold. It transpires that - with the exception of sub-Saharan Africa - many of the most rapidly urbanising countries are those doing best economically. The idea that city growth in the south is in itself an unqualified disaster - an idea enforced by talk of 'exploding cities' and 'urban populations growing out of control' - is being challenged and hopefully can be whittled away.'

Drought Network News, October 1995, Vol. 7.3, Newsletter of the International Drought Information Centre, 20 L W Chase Hall, University of Nebraska, PO Box 830749, Lincoln, NE 68583-0749, USA.

Fraser, Andrew, Maybeck, Michel and Ongley, Edwin, 1995, *Water quality of World river basins*, UNEP Environment Library No. 14, Nairobi: United Nations Environmental Programme, 40pp

Hess, T and Lovelace, G, 1994, *Glossary of soil water and plant terms*, Silsoe: Silsoe College

International conference on water and the environment: development issues for the 21 century, 26-31 January 1992 Dublin Ireland, The Dublin Statement and Report of the Conference.

ICWE, World Meteorological Organisation, 41 Avenue Giuseppe-Motta, Case Postale 2300, CH-1211 Geneva 2, Switzerland

IWRA UPDATE February 1996. Vol.9 1,

Newsletter of the International Water Resources Association. International Water Resources Association, 1101 West Peabody Drive, Urbana, IL 61801-4723, USA

Lundqvist, Jan, 1995, *From ubiquity to scarce resource; intersectoral competition necessitates improved water use efficiency,*

Paper prepared for the International Conference on Water Management Organised by the Confederation of Indian Industry, Madras 8-9 December 1995.

Professor Lundqvist's address: Tema V, S-581 83 Linköping, Sweden, Fax. +46 13 133630, Email: jalun@tema.liuse

'As part of the prevailing water development strategies during the last decades, there has been an obvious tendency to take the 'right to water' for granted. Costly and rather arbitrary arrangements have been developed where water supply to various sectors has been quite liberal. In addition to a lax control over performance in the use of water, there is a corresponding failure to properly address water pollution and to sanction abuse and blatant omissions to take responsibility for the degradation of water and environment which have resulted from various activities in urban as well as rural areas. 'The rights to water' must be rectified so that reciprocal responsibilities are institutionalised.

'The abuse of access to water is not only related to inefficient use and abuse by some of those who are fortunate enough to get subsidised water provisions. It is also often noted that access to water services are still wanting for a fairly large group of the destitute. Many of the poor in both the urban and rural areas have to pay dearly, in cash, kind, health, convenience, etc. to get water.

'Summing up, it is, of course, essential that 'water rights' are clearly spelt out. But when rights become separated from reciprocal responsibilities and when they are coupled with substantial subsidies to the better off sections of society, there is an obvious risk that 'water rights' will also lead to 'water wrongs' in terms of socially, economically and environmentally unnecessary costs and burdens.'

Water and Irrigation Review. PO Box 21051, Tel Aviv 61210, Periodical featuring articles from around the World on various aspects of water and irrigation technology.

This book identifies very clearly the foundations built by farmer practitioners in dryland South Australia.

The authors are uniquely placed to provide a deeply informed study based most importantly on living with the system, but also from participating in formal scientific higher education in agricultural, social and political science and especially at senior levels of Government in South Australia. The book successfully profiles the remarkable adjustments made by farmers arriving from Europe in the late nineteenth century to the unfamiliar semi-arid summer drought regime of South Australia. They learned the hard way that soils were different, could be exhausted and required very different cultivation and management. The inability of the agricultural science community, inspired by concepts and practice in humid Europe, repeatedly to grasp the solutions provided by innovative farmers has been repeated in dryland farming worldwide. The authors carefully document the experience in the Middle East and North Africa in the 1980s and 1990s where they were involved in farmer extension. Anyone struggling to point out to professionals from outside their environmental and socio-cultural milieu to point out that recommended systems and technology are inappropriate would learn a great deal from this study. It catalogues the difficulties of success and the dreadful misuse of resources which result from asserting wrong-headed science whether by staff from local research stations or as a basis for overseas assistance.

'The barriers between the technocrat and the expert farmer are stubborn. Both groups feel superior to the other. The technocrat is open about his belief in his own superiority, the farmer is more covert and only admits his feelings to other farmers. Of course the level of intelligence and innovative energy differs among farmers as it does within groups of scientists, academics, technicians and administrators, but one can make a special case for the expertise of the South Australian farmer who carry within themselves such a unique and comprehensive knowledge of the profitable exploitation of medic pastures.

'The medic farming system grew out of farming innovation. The farmers who evolved it were an aberration - they discovered it in a moment in time when they ruled their small world if only because they were living in a country in which the rest of the world had little interest and influence. They only had this power for a short time - fifty years at most - but this was enough to enable them to establish the fundamentals of the system and to provide them with enough confidence in it to withstand the assaults that scientific and technical experts mounted against it in the next fifty years.'

A valuable feature of the book is the close observation and analysis of the politics of agricultural change and agricultural management. 'National networks within development agencies ... determine the type and origin of farm machinery that goes into aid programmes, the nationality and status of experts who work on aid programmes, and the content of the programme and its objective. Australia is the only country where the medic farming system exists but Australia only has a small network and it plays only a minor and quite feeble rôle in the big aid world.'

This is a book which should be on the shelves of all libraries in institutions world-wide concerned with agricultural science, all aspects of development studies and relayed specialisations, as well as international agencies and NGOs.

Recent climatic change in the world's drylands

Dr. M. Hulme in *Geophysical Research Letters*. Climatic Research Unit, School of Environmental Sciences University of East Anglia, Norwich, UK. tel: 01603 593162, Email: M.Hulme@uea.ac.uk

This is a **very important paper** which documents temperature and precipitation changes in the world's main dry regions over the 20th Century.

Abstract

Precipitation and temperature trends in nine dryland regions are analysed for the period 1900 to 1994. No widespread desiccation in dryland climates is found, the African Sahel being the only region to demonstrate a significant drying trend. All dryland

Drylands and rangelands

Chatterton, B & L, 1996, *Dryland farming,* Cambridge: Cambridge University Press, ISBN 0-521-33141-2, 200pp. CUP, Shaftesbury Rd, Cambridge, CB2 2RU, Fax 44 122 352 5052.

There are few books which provide a sound interdisciplinary scientific analysis of a successful crop and livestock production system developed by farmers themselves. This is understandable because the authors of such studies are scientists and not farmers and they emphasise the science and research station perspective.

regions have warmed, however, with the majority of the warming probably being unrelated to regional dryland effects. This warming may have contributed to a worsening of the P/PE ratio in many of these dryland regions. Three African dryland regions are alone in showing a significant negative correlation between precipitation and temperature, contrasting with the relationship for global land areas of warmer years/decades being also wetter years/decades. The relative lack of warming in the Sahel is noted and increased atmospheric dust resulting from the increased desiccation of the region is suggested as a possible explanation.

Copy of abstract circulated on the internet by Ian Barnes, Information Services, World Conservation Monitoring Centre, 219 Huntingdon Road, Cambridge CB3 0DL, United Kingdom Tel: +44 (0)1223 27731, Fax: +44 (0)1223 277136, Email: Ian.Barnes@wcmc.org.uk WWW: <http://www.wcmc.org.uk>

Tongway, David and Hindley, Norma, 1995, *Manual; assessment of soil condition of tropical grasslands*,

Lyneham: CSIRO Australia, ISBN 0 634 05779 X, 59pp. CSIRO Australia, Division of Wildlife and Ecology, PO Box 84, Lyneham, ACT 2602, Australia. Email: David.Tongway@DWE.CSIRO.AU

Tongway, David, 1994, *Rangeland soil condition assessment manual*, Lyneham: CSIRO Australia, ISBN 0 643 5543 7, 69pp

General development issues

Overseas Development Administration, **Publication list**, available from, ODA, Library AH219, Abercrombie House, Eaglesham Road, East Kilbride, G75 8EA

Serageldin, Ismail, 1995, *Nurturing development: aid and cooperation in today's changing World*, Washington DC: World Bank, ISBN 0-8213-3184-1, 155pp

Munasinghe, Mohan and McNeely, Jeffrey, 1994, *Protected area economics and policy: linking conservation and sustainable development*, Washington DC: World Bank, ISBN 0-8213-3132-9, 364pp

Central Board of Irrigation and Power.

Rising concern over the environmental effects of burning fossil fuels for the generation of electricity and the depletion of those fuels, has led to the formation of a technical committee on Hydro Power. In the first instance the committee will form and publish a data base of energy parameters for 50 countries in the Afro-Asia region.

Copies of the publication are available at US\$60 from; The Central Board of Irrigation and Power, Malcha Marg, Chanakyapuri, New Delhi 110021, India.

Central Board of Irrigation and Power. *Updated directory of power utilities in the Afro-Asia Region.*

Directory produced by the International Association on Electricity, Generation, Transmission and Distribution. Available

from Central Board of Irrigation and Power at address above costing US\$60.

WATER, FOOD & TRADE

Cohen, Joel, 1995, *How many people can the Earth support?*, New York: W W Norton & Company.

A variety of topics are tackled in this book: world population, future population projections, explanations of historical fertility decline as well as the earth's carrying capacity. There are three interrelated themes. First what will future population growth be and what are the likely consequences. The second is how many people can the earth support. The third theme is that even though we do not know the future population, the historical and recent increases in world population creates a serious risk.

Estimates of possible carrying capacity vary greatly, from 1.1bn to 1,000bn. Despite the lack of accuracy and uncertainty, to ignore the issue is, to use the authors simile, like driving a car towards a brick wall at night with dim headlights arguing that there is no danger because the car has not crashed yet.

Overseas Development Administration, 1996?, *Feeding the Earth; The ODA sustainable agriculture strategy*, five page pamphlet outlining the ODA's commitment to and strategy for promoting sustainable agriculture.

Trip, Robert and van der Heide, Wieneke, 1996, *The Erosion of crop genetic diversity: challenges, strategies and uncertainties*, Overseas Development Institute, Natural Resource Perspectives No. 7 March 1996, ISSN 1356-9228, 4pp, Overseas Development Institute, Regents College, Inner Circle, Regents Park, London NW1 4NS, UK. Tel. +44(0)171 487 7413, Fax +44(0)171 487 7590 Email: agre@odi.org.uk

Trip, Robert and Gisselquist, David, 1996, *A fresh look at agricultural input regulation*, Overseas Development Institute, Natural Resource Perspectives No. 8 March 1996, ISSN 1356-9228, 4pp

Martin, Will and Winters, Alan, 1995, *The Uruguay Round: widening and deepening the World trade system*, Directions in development series, The Uruguay Round: creating a global trading system: Washington DC: The World Bank, ISBN 0-8213-3488-3, 31pp

The following are from the publication:

'The round is likely to generate global income gains of up to \$200bn a year, with somewhere between a quarter and a half of the gains going to developing countries, primarily to the ones that have reduced their own protection and lock in the benefits of earlier reforms (pp1).

'It has been clear for some time that developing economies would play a much more important role in this round than previously. Developing countries are increasingly open, and they depend heavily on the health of the international trading environment. An open economy has a strong and direct interest in the World economy and its trading rules (ppv).

'The Middle East and North Africa region and the economies in transition have small GDP gains, primarily because they undertook few commitments to liberalise under the round. Indeed many of these countries are not yet members of the WTO. Sub-Saharan Africa's Loss reflects the lack of liberalisation, the small increases in world prices for some foods, and the higher prices of

imported textile and apparel products. Highly efficient textile and apparel exporters restricted by the Multifibre Arrangement are currently forced to divert their products away from import markets that are under the arrangement and to sell them elsewhere at low prices' (pp7).-8

'Few reductions in agriculture - but greater transparency and a framework for the future

From non-tariff barriers to bindings - a major achievement

The agreement involved substantial cuts in import tariffs on agricultural products: an average of 36% in industrial countries over six years, with at least a 15% reduction on each individual tariff line. Developing countries committed themselves to reductions of 24% over ten years; while least developed countries were exempt from reduction commitments.'

'But the bindings are dirty

'The agricultural agreement is less impressive than cuts would suggest because base levels for these cuts were frequently inflated in three ways: the choice of base period, the methods used to measure the protection existing before the round and the use of ceiling bindings in developing countries' (pp14).-15

'Developing Countries into the fray-

'Many developing countries were very active participants in the Uruguay Round, both individually and in coalitions with industrial countries.'

'Not only did developing countries participate in formulating new rules for the World trading system, they also made important market access offers in the conventional area of tariff protection on manufactures trade and in areas that were new to the trade liberalisation process, such as trade in services and agriculture.

'Much remains to be done to remove protection in developing countries and to improve the rules-oriented trading system in ways that better protect the interests of the smaller players in World trade' (pp29)

The report was written before any effects of the WTO - initiated in the spring of 1995 - had become evident. The predictions would seem to have been optimistic with respect to the prices at which cereals would be traded.

Khhor, Martin, 1996, Free trade for whom?,

in *ORBIT*, First Quarter 1996, No 60, pp7-9

The Uruguay Round of GATT has set the scene for world trade in this decade and into the next century. Martin Khhor examines the impact of the round on the developing world, and reveals the myths that make up free trade.'

'Free trade is now one of the favourite phrases bandied about by political leaders and in the media around the world. It is usually accompanied by terms such as "globalisation" and "liberalisation". In fact, free trade is being promoted with such vigour by the establishment that many people almost automatically think that it is a good thing for all nations to practice it.

'But the opening up of borders so that imports can flow in easily can create problems for a country, unless it can also raise its exports to other countries at the same rate or faster. Strong countries with big companies usually take advantage of trade liberalisation, whilst weaker countries can often end up losing. It is not true that "everyone gains from free trade"'

The gathering wheat crisis: Mid-East may suffer, CERES, pp 12-13, Rome: FAO.

'Bread is fast replacing rice as the staple food in the crowded urban centres of developing countries...[with] consumption ...growing by 5% a year since the 1960s.' This is in a period of rising wheat prices - US\$140 to US\$210 between November 1994 to November 1995 - caused by cuts in government subsidies to producers (as part of the GATT Uruguay Round) and hikes in shipping costs. The price rise is set to continue as all the world's main wheat producers suffered drought during 1995.

In the Arab World wheat consumption has increased from 100kg per capita (1985) to 142kg per capita in 1995. The International Wheat Council (IWC) estimates that the 11 Arab wheat importing countries would import US\$6bn during 1996. The three largest

importers, Egypt, Algeria and Morocco are likely to face a balance of payments crisis as a result.

Internal Middle East wheat production declined sharply in 1995 as a result of drought, in a number of countries, and by choice in Saudi Arabia as the government reduced subsidies. This is at a time when world strategic stocks have fallen to a 20 year low.

Grain market report, March 1996, International Grains Council

Address: 1 Canada Square, Canary Wharf, London E14 5AE. Tel. 0171 513 1122, Fax 0171 712 0071, Email: igc-fac@int-grains-council.co.uk

This is a monthly report on the state of world grain production, trade, consumption and stocks. In view of the fact that world stocks are at their lowest for 20 years the Council Reports, 'If current production forecasts are realised, with output projected to rise in both exporting and importing countries, concerns over the adequacy of supplies could begin to abate in 1996/97. World trade is forecast to increase 1m tons up from this years figure of 97m tons. Reduced demand in Africa, Russia and Brazil is likely to be compensated by a further rise in imports into the Far East, including China.

Taking account of the above forecasts of production, consumption and trade, a small recovery of 4m tons is projected for world stocks. Most of the increase is likely to occur in the major exporters, particularly the EU.

MEWREW ON THE NETWORK

SOAS Water Issues on the Network

The SOAS Water Issues Group

Department of Geography, Centre of Middle Eastern Studies and Centre of African Studies

There is now a page on the World Wide Web which can be accessed via the codes listed below. The following is a summary of the web page.

Web access to SOAS Water Issues

<http://www.soas.ac.uk/Geography/WaterIssues/>

Research and Consultancy on water at SOAS

Staff, graduate students and associated researchers at the School focus on fresh water as a key global renewable natural resource. Attention was first devoted to the Middle East as the region which has experienced the world's most serious and accelerating water deficits since the early 1970s. As studies revealed that the region's governments had been able to achieve remarkable economic adjustments to the apparently conflict loaded water challenge in the region emphasis has shifted to view the problem globally. It has been in the global political economy of 'virtual water' internationally traded in for example, food staples, that the Middle East has been able to find the solution to its 'water crisis'. The future research will focus on the nature of the global political economy of water and on the capacity of this system to provide sufficient affordable 'virtual water' in international trade. The water resources of Africa are also given emphasis and materials collected on such resources.

Activities and services

The water resources database

The materials collected in connection with studies and publication have been entered into a constantly expanding **water resources database**. There are 1250 entries, key word classified. Almost all items listed can be copied and supplied subject to a charge (or exchange where appropriate) according to the size of the publication and copyright regulations. Some items cannot be copied because the material is subject to client confidentiality considerations.

It should be noted that the database is a list of the collection of books, reports and documents held in the Department at SOAS. The list is not intended to be a comprehensive bibliography of

all relevant sources. Also we have only recently embarked on the collection of African materials.

MEWREW - Review and Newsletter

The Middle East and Africa Water Review appears three times per year. It includes the programmes for water related conferences, seminars and training workshops held at the School. It also provides reviews of recently published books, reports and agency studies very soon after their publication. Other notices of related international activity and on the co-ordination of water studies throughout the world.

Consultancy

Staff and research assistants act in a consulting capacity. The following studies are examples have been completed in the recent past:

- 1993 EU Technical assistance programme to the Aral Sea basin countries for management of water resources
- 1994 Appraisal of JICA drilling programme in Zimbabwe
- 1994 Commonwealth Secretariat; discussion paper on water policy options
- 1994 Contributions to AFRICOVER land cover mapping and information system for FAO
- 1995/96 Appraisal of the Netherlands international assistance programme on irrigation to Egypt for the Netherlands Ministry of Foreign Affairs
- 1995 Water harvesting and supplemental irrigation in the West Asia and North African countries. Preparatory studies for ICARDA, Aleppo.
- 1996 Socio-economic survey and analysis of water resource related issues in rural communities in the Ta'iz area of Yemen. For UNDP and the Yemen Government by C Handley of SOAS. Other surveys of water use in agriculture under discussion.

If you want to receive the newsletter please complete the slip

Water resources studies at SOAS

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• giving a paper on a Middle Eastern or African topic - brief title

• giving a paper on a non-Middle Eastern or African topic - brief title

• other comment and/or suggestions

Please return to: Professor Tony Allan, SOAS, London WC1H 0XG, Tel 071 323 6159, Fax 071 436 3844, email ta1@soas.ac.uk

RECENT BOOKS

By staff and associates of the
SOAS Water Issues Group

Abate, Z., 1994,
Water resources development in Ethiopia, Reading: Ithaca Press.
ISBN - 86372 169 9, hardback, £30.00.
Garnet Press, 8 Southern Court, South Street,
Reading RG1 4QS, UK. Fax 44 0173 459 7356

Allan, J. A. and Warren, A., 1993,
Deserts: a conservation atlas
London: Mitchell-Beazley.
ISBN 1 85732972 4, hardback, 176 pp, £19.99.
Mitchell-Beazley, Reed Illustrated Books, Michelin
House, 81 Fulham Road, London SW3 6RB, Fax 44
0171 589 8419

Howell, P.P. & Allan, J.A., 1995,
The Nile: managing a scarce resource
Cambridge: Cambridge University Press.
ISBN 0 521 45040 3, hardback, 408 pp, c£39.00.
CUP, Shaftesbury Rd, Cambridge, CB2 2RU, Fax 44 122
352 5052.

Allan, J.A. and Mallat, C., 1995,
Water in the Middle East: legal, political and commercial implications
London: I. B. Tauris Publishers, Tauris
Academic Studies.
ISBN 1 85043 645 2, 320 pp, hardback, £55.00.
I B Tauris, 45 Bloomsbury Square, London WC1H 2HY, UK.
Fax 44 171 916 1068

NEW

Allan, J. A. (with Court, J. H.), 1996,
Water, peace and the Middle East: negotiating resources in the Jordan basin
London: I. B. Tauris Publishers, Tauris
Academic Studies.
ISBN 1 96064 055 9, 250 pp, hardback, £39.50.
I B Tauris, 45 Bloomsbury Square, London WC1H 2HY, UK.
Fax 44 171 916 168

Merrett, Stephen, 1996,
Introduction to the economics of water resources
London, UCL Press, c 200 pp, paperback. £14.95.
UCL Press, Gower Street, London WC1E 6BT. Tel 44 171
387 7050

Bibliographies and databases

Allan, J. A., Wild, J. & Griffin, I.
Water in the Middle East and Africa: bibliography of material held by the SOAS Water Issues Group
SOAS Water Issues Workshops: Available in Room 324
SOAS and networked. Paperback £12.50.
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UK. Fax 44 171 436 3844, email ta1@soas.ac.uk