

# Water

A key element in Jordan's future

Sarah Graham-Brown

It may be a cliché to say that water is a key element in Jordan's future economic development, but after four years of drought the point has certainly been rammed home.

Water scarcity becomes a reality when in summer in Amman you can turn the tap on only once or twice a week with any hope that water may come out and in the parched countryside shrivelled crops fight to survive. Although, after this winter's abundant rains, the country in spring looked almost as green as England, all the dams were full, and the immediate sense of crisis was over, it is a fact that recoverable water resources are very limited. Attempts are now being made to pinpoint more sources, particularly in the Jordan Valley and Wadi Araba where the US consultants Dames & Moore are currently carrying out a survey.

A survey of northern Jordan (from the Dead Sea northwards) in 1978 by the UK consultants Howard Humphries, one of the most comprehensive of recent studies, estimated that at present rates of economic and population growth the shortfall would be 140 million cubic metres a year (mcm/a) by 1987 and 298 mcm/a by 2000. This suggests that soon planners will have to confront some difficult questions about how to share this scarce resource between agricultural, industrial and domestic needs.

The first phase of Jordan Valley irrigation has substantially boosted agricultural water use since 1976, and in the towns, rural-urban population drift and fast population growth have rapidly increased domestic water requirements — the most dramatic rise in demand is in the Amman-Zarqa region. Expansion of industry here has helped to strain existing resources. It has even been necessary to consider diverting water originally intended for agriculture to meet domestic needs.

## Irrigation gets largest share

Irrigated agriculture still consumes most of existing resources for the moment. Phase I of the Jordan Valley scheme, which was completed in February 1980, has provided an important water carrier — the East Ghor canal (EGC), running from the Yarmouk river in the north to a point near Karama, north of the Dead Sea. It is fed by the unregulated flow of the Yarmouk river and from the Zarqa river and other side wadis.

The canal's original 70 kilometres, financed by USAID, stretch from the Yarmouk to Al-Arda. Two extensions have been built: the first, which added

eight kilometres, was financed by the Kuwait Fund for Arab Economic Development (KFAED) and was completed in 1969; the second, which took the canal south another 18 kilometres to South Shuna, was financed by USAID and completed in 1978. The final section, which will be part of the \$1,000 million second phase, will reach the Dead Sea and will be fed by the Maqarin dam.

Several small schemes to regulate and store water from side wadis carved into the escarpment have also been completed in Phase I. The largest is the King Talal dam in the hills above the Jordan Valley. It controls the flow of the Zarqa, the only other substantial river apart from the Yarmouk. With a storage capacity of 48 mcm, this is the largest dam built so far in Jordan. Another large dam, the Khalid Ibn al-Walid, planned in the 1960s on lower reaches of the Yarmouk was foiled after the Israeli occupation of the Golan Heights in 1967.

The King Talal dam has had considerable teething pains. Water finally flowed down its spillway in January 1980 as, for the first time since completion in 1978, it was filled to capacity.

The dam was designed originally to supply water for irrigating the valley, under the control of the Jordan Valley Authority (JVA). But in 1977 because of growing domestic water shortages, it was planned to use part of the dam's water to serve Amman's needs. This was dropped recently, apparently because the water is now considered too polluted.

How serious or permanent is the pollution? Experts disagree. The Zarqa river gets heavy doses of industrial and chemical waste — particularly nitrates, phosphates and phosphorus. This is shed by the Amman/Zarqa conurbation in which is 90 per cent of Jordan's industry, 60 per cent of the motor vehicles and 65 per cent of the population.

## Summary of water planning and operational responsibilities

Responsibility	NRA	WSC	AWSA	JVA
Water policy planning	National water policy	National water supply policy	None	Within service area only
Water supply	No	Yes	Yes	Yes
Waste water disposal	No	Yes	Yes	Yes
Irrigation supply	Yes	No	No	Yes
Agricultural drainage	Yes	No	No	Yes

NRA — Natural Resources Authority

WSC — Water Supply Corporation

AWSA — Amman Water & Sewerage Authority

JVA — Jordan Valley Authority

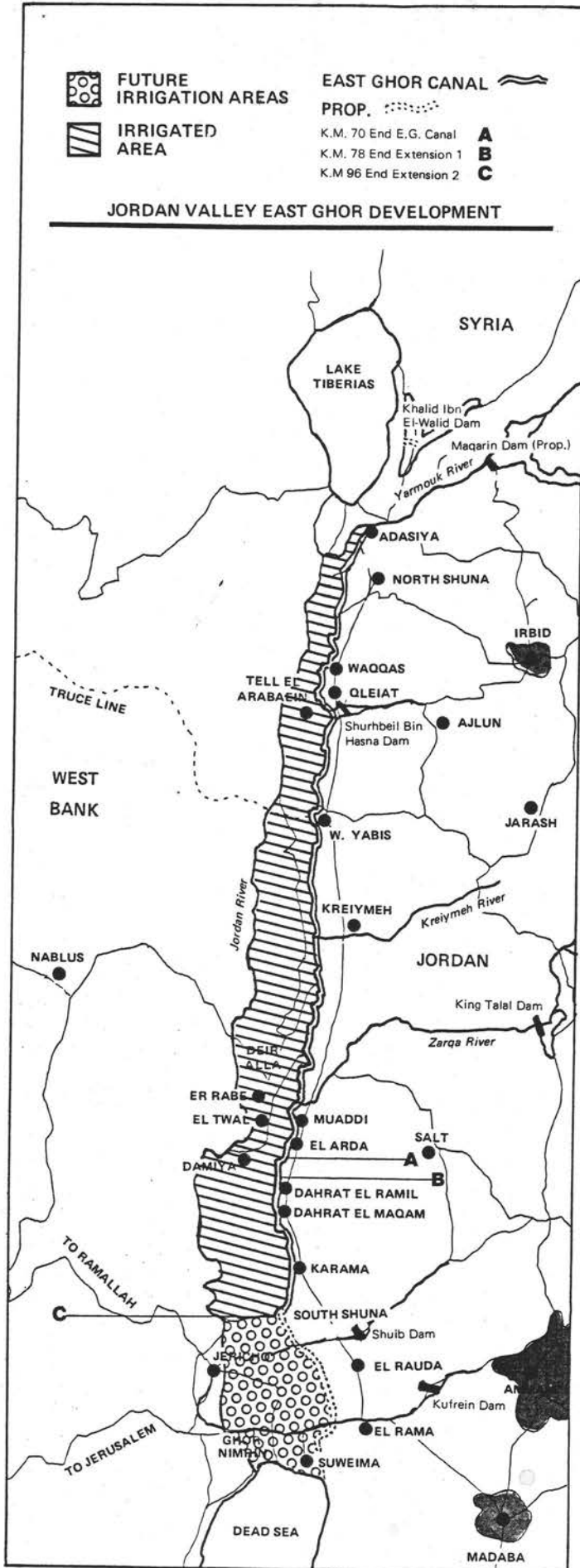
Source: Amman Urban Regional Planning Group

Factory waste is discharged untreated into the river and poses a serious threat to a valuable water source. If initial river pollution can be checked, it has been suggested that the King Talal dam could be important in recycling water. The Howard Humphries report of 1978 suggested that indirect re-use — by the return flows of waste water for Amman — could amount to 16 mcm/a, although there could be salinity and pollution, it warns. For the present, however, the dam carries out its original role as supplier of water for agriculture.

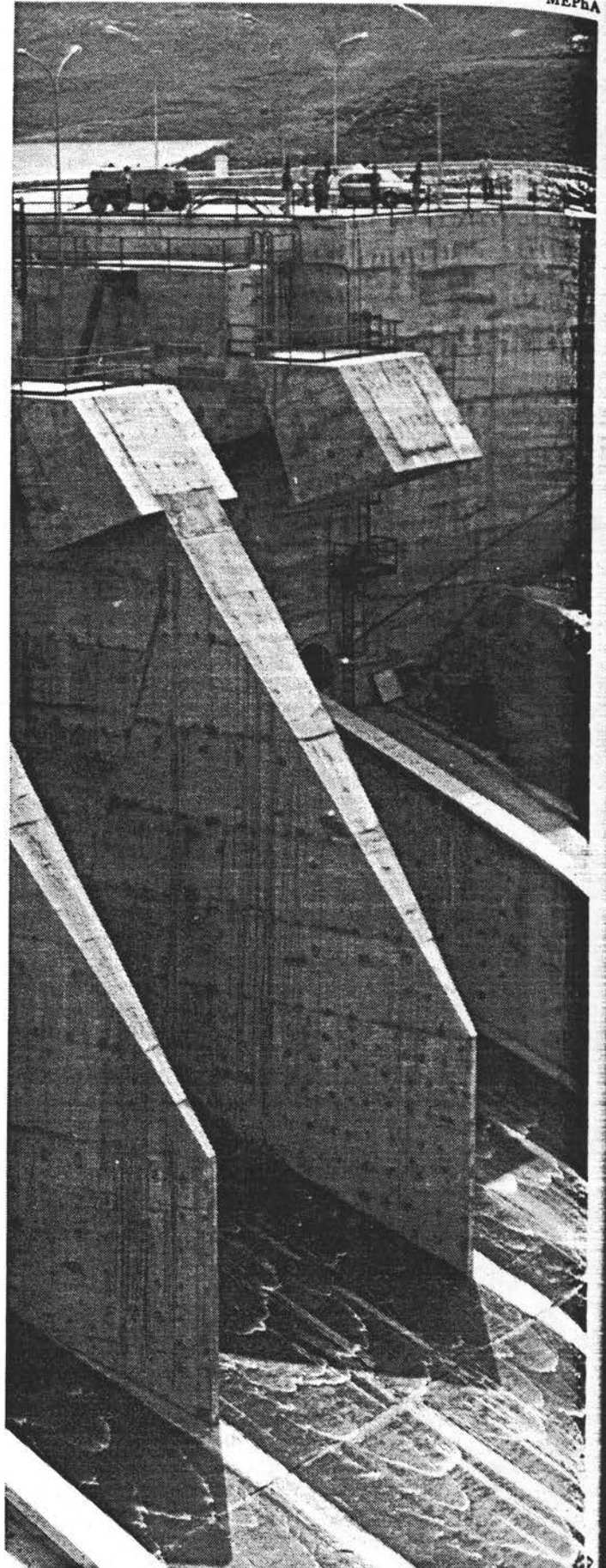
The projected Maqarin dam on the Yarmouk river on the Syrian border is an essential part of water planning calculations for the next decade. Its live storage capacity will be 388 mcm/a and, like the King Talal dam, it was intended originally for use exclusively in Phase II of the Jordan Valley scheme. A certain proportion of the total water stored is to be allocated to Syria where part of the dam lies. Now 26 mcm/a has been allocated for the domestic needs of nearby Irbid, the largest town in the north, and 100 mcm/a to Amman. These allocations form part of the northern domestic water supply scheme which will include an expensive project to pump water carried from Maqarin by the East Ghor canal from the valley back up to Amman. Financing for pumping stations, intake structure and treatment plant comes from USAID. The scheme is now at the pre-qualification stage.

The sheer volume of water the Maqarin dam will be able to store may help to lessen Jordan's dependence on the vagaries of annual rainfall both for agricultural and domestic wellbeing. But this is still some years ahead: assuming the international financial package needed to fund so vast a project is agreed, building will take at least five years.

Until then Amman, in particular must >



The King Talal dam — water flowed down its spillway in January 1980, for the first time since completion





1980  
MEPHA

bridge a widening gap between demand and present supply. Its main supply comes from artesian wells in an aquifer which is considerably overpumped already — by up to 10 mcm/a, while its rechargeable capacity is about 20 mcm/a.

A stop-gap will be the desert oasis of Azraq, east of Amman. Howard Humphreys is supervising construction of a pipeline to bring 8 to 10 mcm/a from Azraq to Amman. This will ease — but not completely solve — supply problems over the next six to eight years.

In the mid-1970s there was some reluctance to develop desert water sources, most of which are far from areas of high demand, but the seriousness of the shortage has overcome this reluctance. Groundwater sources at Swaqa and Qastal in the desert south of Amman are also being tapped to supply the southern approaches to Amman, including the planned Sahab industrial estate.

The southern port city of Aqaba, surrounded by desert, might be expected to have water supply difficulties because both population and industry are growing rapidly. Fortunately water has been discovered in the Qa Disi flats among the lunar sandstone mountains northeast of the port.

Seven production wells are tapping this depletable fossil water source which is then piped to Aqaba. The contractor is Laing of the UK in a joint venture with Trocon of Amman; Howard Humphreys is consultant and supervisor. The pipeline will supply domestic needs but up to half the water will go to the Jordan Fertiliser Industries plant, in what is known as Wadi Two, near the Saudi border.

Howard Humphreys, which is consulting engineer for the whole Aqaba water scheme, made a preliminary estimate in 1977 that the water would last at least 50 years pumped at the rate of 20 mcm/a.

Initially pumping is expected to produce about 11 mcm/a.

Once this source is exhausted, Aqaba may be forced to rely on desalination and already a feasibility study for a thermal power station at Wadi 2 includes a look at the possibility of including a desalination plant.

On the national level, the 1976-80 plan envisaged extending water supply, however skeletal, to 95 per cent of the population by 1980. This target has not yet been met, according to the new director of the Water Supply Corporation (WSC), Said Bino, but projects designed to give that coverage are under way. The next five-year plan is expected to boost coverage to 98 per cent, with commensurate increases in quality and availability of service.

#### Water wheeler-dealers

Distribution is a big problem which, in Amman particularly, is almost anarchic. There is no comprehensive law controlling use of domestic water and it is sold by private dealers from tankers to people whose homes are not connected to the mains supply. People also buy water in this way to supplement mains water which, by midsummer, is turned on only once or twice a week. Buying water is expensive for people on low incomes.

"Dirty water" (sewage) has had to take a back seat because of the expense of treatment works, Bino says. Outside Amman, only Salt has sewerage. A plant is under construction at Jarash and others are being designed for Irbid, Zarqa and Rusaifa. During the next plan designs for sewerage are expected to be completed for all centres with more than 20,000 people. However, finance will not be available to build during the next five years, Bino says.

Control of water and its exploration is

complex. Agricultural water in the Jordan Valley is controlled by the JVA and outside it by the Agriculture Ministry. However the JVA is an integrated development authority so it also controls the establishment of domestic water systems in the valley. It is also responsible for both the King Talal dam and the projected Maqarin dam which provide, or will provide, water outside the valley. The JVA took over control of natural resources in the valley from the Natural Resources Authority (NRA), which is responsible for exploration outside the valley. The NRA also provided the drilling equipment for Dames & Moore of the US in Wadi Araba although it handed overall control of the wadi to the JVA three years ago.

Control of domestic water is just as complicated. Water in Amman municipality is controlled by the Amman Water & Sewerage Authority (AWSA). In theory all other domestic water outside the valley (including industry and army camps) is controlled by the WSC. But the WSC, formed in 1973, has not yet taken over from all the municipalities which had supervised water supply and distribution. Most municipalities were reluctant to hand over control while water supply was fairly profitable, but now rising costs of pumping and labour make it worth relinquishing control.

As things stand, the WSC acts both as bulk supplier and distributor in only a few municipalities. It now controls water in most of the villages, supplying customers direct.

This method of organising water is a handicap in a country which cannot afford to waste it. An overall water planning authority is proposed which would take decisions on long-term strategy and this may well feature in the next national plan. **SG-B**

## JORDAN-GULF BANK

ESTABLISHED 1977

HEAD OFFICE

JABAL AL - HUSSEIN

KHALID BEN AL WALEED STR.

AMMAN - JORDAN

P.O.BOX: 9989 TEL: 21959 JGBANK JO

CABLE: ARIJBK AMMAN - FOR HEAD OFFICE AND BRANCHES

IN THOUSAND JORDAN DINARS

	1978	1979
CAPITAL + RESERVES	4,042,854	5,144,414
DEPOSITS	3,787,734	14,881,751
TOTAL ASSETS	7,900,435	20,752,928

JD. 1 = U.S. DOLLAR 3.39 (APPROX)



#### BRANCHES IN JORDAN

- MAIN BRANCH  
PRINCE MOHAMMAD ST.  
AMMAN
- JABAL AMMAN BRANCH
- AL - WAHDAT BRANCH
- COMMERCIAL AREA BRANCH
- ZERKA BRANCH
- MADABA BRANCH