

Small-scale irrigation in the nineties

by Peter Stern

The ancient practice of irrigation has changed substantially this century; but what is the bottom line?

THE IRRIGATION OF crops has been practised for a very long time in most parts of the world, and many ancient civilizations could not have developed and sustained themselves without it. In India, people were farming with irrigation as early as 4000BC;¹ elaborate irrigation systems existed in the Tigris and Euphrates river basins 4000 years ago; and rice, one of the world's oldest food crops, has been grown in China for 5000 years and is known to have been irrigated for 2700 years.² Agriculture in the Nile Valley has depended on irrigation for 5000 years, and 2500 years ago there were intricate irrigation systems in the Central Andes.³

Most agricultural activities, and particularly irrigation, can only succeed against a background of social stability and within the framework of settled social organization, and the ancient communities which practised irrigation were highly organized. The Hammurabi Code, which was developed during the reign of King Hammurabi of

Babylon nearly 3800 years ago, was a code of 282 case laws covering all aspects of economic and social life. These include laws about irrigation practice, such as law 55: 'If a man has opened his irrigation ditch and, through negligence, his neighbour's field is flooded with water, he shall measure back corn according to the yield of the district.'

Irrigation practice was woven into the culture of these ancient communities, and the benefits derived from it were direct benefits to the community. This concept of irrigation as part of the fabric of society still exists in regions where irrigation has been traditional for centuries, but it has in some cases been obscured by a new emphasis on irrigation which first appeared in India during the latter part of the nineteenth century, and which has also had its effect in many other parts of the world. This emphasis has placed greater weight on the commercial advantages of irrigation.

Formal schemes

Government intervention through the introduction of engineering technology and disciplined management served the dual purpose of improving crop production and providing sources of public revenue. In India, the government of the time was able to undertake major capital works to this end, and this set the pattern for the development of 'formal' irrigation in many other parts of the world. Throughout Asia and in Egypt and the Sudan, governments established departments of irrigation, and engineering skills were directed into the construction of river barrages and other control works, main supply canals and distribution systems, all carefully designed for optimum performance. In the United States both government and private enterprise moved into commercial irrigation. During the second half of the twentieth century, the commercial irrigation of sugar cane, rice, and most other grain crops, and fruit and vegetables, has been developed all over the world.

One feature of many large-scale formal irrigation systems has been the inevitable undervaluation of the people actually engaged in the irrigation. In



UNICEF/Murray Lee

Traditional methods of water supply and irrigation exist all over the world. This hand-dug inverted 'cone' in Mali was built during a recent drought.

most countries where irrigation has been traditional for centuries, and also in the USA, the farmers' identity and authority has been maintained. But in others, where irrigation has been a fairly recent development, the identity, and thus the authority, of the farmers is often obscured: on the Gezira Scheme in Sudan, they became known as tenants, while on many commercial undertakings in Africa and South America, they are employees. While engineers have always ensured technical excellence in their designs, engineers and development planners have tended to regard irrigation in terms of regulated water supplies delivered to uniform units of land, supporting orderly cropping patterns, tended by well-disciplined operators.

It is not therefore surprising that during the past three or four decades, many large-scale, formal irrigation schemes have run into difficulties. The World Bank, having committed very extensive financial resources to a number of major irrigation developments, began to be concerned about this in the 1970s and has since been putting a lot of time and money into trying to rectify the deficiencies in the management and organization of some of these schemes. In examining the problems of the large schemes it became apparent that small indigenous developments did not suffer from the same problems because, as one World Bank consultant put it, small schemes 'are often remarkable for their social cohesion and sense of common purpose'.⁴ But he also observed that most small schemes could benefit from better advisory services.

Organizations

The 1980s saw a growing interest in developing and promoting small-scale schemes. The view commonly expressed in the 1970s, that small schemes could look after themselves and did not warrant attention or promotion, has given way to an awareness of the importance of small schemes to rural community development. To this end, investigations, studies, and workshops have been organized in different parts of the world. By 1980 the Irrigation and Drainage Branch of the Land Development Division of the Ministry of Agriculture in Kenya, had established a Small-scale Irrigation Unit, sponsored by technical assistance from the Netherlands. In 1981 the National Christian Council of Kenya organized a conference on Irrigation Development in Arid and Semi-arid Areas of Kenya, which was devoted mainly to indigenous small-scale

schemes. Harry Underhill, the author of the article on 'Planning small-scale schemes' in this issue of *Waterlines*, was involved in organizing an international meeting on small-scale irrigation in Africa at the Food and Agriculture Organization of the United Nations (FAO) in November 1982. FAO has recently published a series of training manuals for field assistants and irrigation technicians which includes material relevant to small-scale irrigation.

The International Irrigation Management Institute (IIMI) in Colombo, Sri Lanka, was set up in 1984 as a centre for research in the management and performance of irrigation, and is concerned with all aspects of management in irrigation projects. Today it has country programmes and field offices in Bangladesh, Morocco, Nepal, Pakistan, the Philippines, Sri Lanka, Sudan, Burkina Faso, Niger, and Nigeria. One of its on-going research operations is in farmer-managed irrigation systems, and the article by Douglas L. Vermillion, Irrigation Specialist at IIMI, describes some of the changes which are taking place in the structure of irrigation management in a number of countries.

The IIMI also has an active link with the Irrigation Management Network of the Overseas Development Institute, London, which regularly publishes a Newsletter and papers on irrigation management issues which often feature farmer management and small-scale irrigation.

The article by Carlos de la Torre and Rubén y Toribio Quiape describes an interesting project in Peru in which Intermediate Technology are providing technical assistance to rural communities through their own traditional social and economic organizations.

Another international body which provides a forum for irrigation technology world-wide is the International Commission for Irrigation and Drainage, with its headquarters in India. ICID is composed of some sixty-two member countries, who participate in international committees and working groups on all aspects of irrigation, including micro-irrigation, management, and environmental impacts. Every three years ICID holds an international congress in a different part of the world, with regional gatherings in the intervening years. The British Section of ICID, based at the Institution of Civil Engineers, London, has both corporate and individual members, and many of these are members of international working groups. The April 1993 issue of the British Section's 'News and Views'

contains an article on small-scale irrigation.

Richard Carter, who has written about feasibility studies in this issue, set up a Working Group on Small Scale Irrigation in 1988 to promote the exchange of information, experiences, and ideas. This group meets two or three times a year at different locations in the UK.

HR Wallingford in the UK has used the knowledge that they have gained on small projects in Kenya and Zimbabwe to introduce new computer aided design to small irrigation schemes for farmers looking to the future. ●

References

1. Central Board of Irrigation and Power, 'The Development of Irrigation in India', New Delhi, 1965.
2. Grist, D.H., *Rice*, Longman Green & Co., London, 1953.
3. New Encyclopedia Britannica, 15th edn, 1986, Vol.13, p.366.
4. Bottrall, A.F., 'Comparative Study of the Management and Organization of Irrigation Projects', The World Bank, Washington, 1981.

Useful addresses

Water Resources and Management Service
Land and Water Development Organization
Food and Agriculture Organization of the United Nations (FAO)
Via delle Terme di Caracalla
00100 Rome
Italy

Freedom from Hunger Campaign/Action for Development Unit (FFHC/AD)
Food and Agriculture Organization of the United Nations
Via delle Terme di Caracalla
00100 Rome
Italy

The International Irrigation Management Institute (IIMI)
PO Box 275
Colombo
Sri Lanka

The International Commission on Irrigation and Drainage (ICID)
48 Nyaya Marg
Chanakyapuri
New Delhi 110 021
India

The British Section, ICID
The Institution of Civil Engineers
1 Great George Street
Westminster
London, SW1P 3AA,
UK

The Irrigation Management Network
Overseas Development Institute (ODI)
Regent's College
Inner Circle
Regent's Park
London, NW1 4NS
UK

Peter Stern is a consulting engineer and he can be reached at Critchfield Cottage, Bosham Lane, Bosham, Chichester, West Sussex PO18 8HG, UK.