



# Irrigation and Water Forum

Sharing knowledge  
on global water issues

British National Committee of the  
International Commission on Irrigation  
and Drainage (ICID)

[iwaterforum.org.uk](http://iwaterforum.org.uk)



## Two Day Short Course

### Irrigation: An Introduction to Policies and Practices in the Context of International Development

22<sup>nd</sup>/23<sup>rd</sup> October 2015

At the Institution of Civil Engineers, One Great George St., Westminster SW1P 3AA

Organised by the Irrigation and Water Forum<sup>1</sup>, with support from the Institution of Civil  
Engineers and the Jack Wright Memorial Trust<sup>2</sup>

#### Course objectives

This 2-day short course seeks to provide participants with insights and understanding of how irrigation systems, both large and small, are planned, designed and managed, and of the economic and livelihood benefits of irrigated agriculture. The course will draw on experience of water resources and irrigation development in a range of countries in Europe, Africa, and Asia.

#### Target audience

The course is designed for graduates and professionals who are, or will be, working internationally in the water resources and rural development sectors. The course is broad-based, covering engineering, social sciences, economics and management disciplines; it does not require specialist knowledge in individual disciplines but does require an interest and desire to learn about water resources and irrigated agriculture in the context of international development.

#### Context

Worldwide, irrigated agriculture consumes around 70 percent of all water abstracted from rivers and groundwater. Irrigation is important at a variety of levels, at a national level in countries such as Egypt, India, China, Indonesia, Vietnam and Bangladesh where irrigated agriculture is a central component of food production and economic development, and at farmer level where irrigation is often fundamental to survival and to livelihoods.

Increasingly in many locations where water resources are becoming scarce and constrained, there is competition between uses and users of water. In countries such as India, China and Pakistan there is increasing pressure on the irrigation sector to improve the efficiency and productivity of water use,

<sup>1</sup> More information on the Irrigation and Water Forum can be found at: <http://iwaterforum.org.uk/>

<sup>2</sup> More information on the Jack Wright Memorial Trust can be found at:  
<http://www.ukia.org/jackwrightmemorialtrust>

and pressure to release water from the irrigation sector for other uses (e.g. domestic, industrial, energy production, environment). In these cases the value of water becomes a major consideration – water for food or water for economic development and supporting growing urban communities?

Professionals working for consulting firms, NGOs or aid agencies in the water resources and rural development sectors may often be working in localities where irrigation is the main user of water, yet they may not appreciate or understand the benefits of irrigation to local communities, or the processes and water demands of irrigated agriculture.

The Irrigation and Water Forum is keen to support the resurgent interest in irrigated agriculture and is therefore offering this short course, with support from the Institution of Civil Engineers and the Jack Wright Memorial Trust, to provide participants with a basic level of understanding, knowledge and appreciation of the fundamental processes, procedures and benefits of irrigated agriculture.

## **Cost**

The cost of this 2-day course is £300, with a concessionary fee of £125 for self-funding participants. For those qualifying for the concessionary fee the balance of the course fee will be funded by a grant from the Jack Wright Memorial Trust. The concessionary fee is not available to participants funded by companies. Participants should request support from the Trust when applying for the course. The cost includes the provision of lecture notes, refreshments and lunch. Participants are expected to make their own arrangements for any travel to, and accommodation in, London.

The Irrigation and Water Forum is grateful for the support provided by its members, the Institution of Civil Engineers and the Jack Wright Memorial Trust which has enabled the course costs to be kept comparatively low.

## **Location, Booking and Registration**

The course will be held at the Institution of Civil Engineers, One Great George Street, Westminster, SW1P 3AA. Westminster is the nearest tube station.

**Applicants need to apply and pay online at <https://www.ice.org.uk/events/irrigation-and-introduction-to-policies-and-practi#overview>**

Any queries should be addressed by phone or mail to Tim Fuller, IWF Secretary, c/o The Institution of Civil Engineers, One Great George Street, Westminster, SW1P 3 AA, Email: [Tim.Fuller@ice.org.uk](mailto:Tim.Fuller@ice.org.uk) Tel: 0207 665 2234.

Separately, applicants are requested to provide a short CV and covering letter explaining why they wish to attend the course and, in the case of individual applicants, justification for seeking support from the Jack Wright Memorial Trust. Please send by email or post to Tim Fuller.

There are a limited number of spaces available so applicants are asked to book by no later than Friday 16<sup>th</sup> October 2015 at the latest. Registration will take place between 09:30 and 10:15am on Thursday 22<sup>nd</sup> October. A certificate will be awarded to participants who complete the course.

The start of the course on Thursday has been put back to 10:15am to cater for some participants who might be travelling into London.

## **Cancellation**

The Irrigation and Water Forum reserves the right to cancel the course if insufficient participants (less than 10) are registered on the course by 5pm on Friday 16<sup>th</sup> October, 2015.

## Course outline

### Session I: The Role and Impact of Irrigation in Global Agriculture

#### *(i) Irrigated agriculture and water use: The Global Picture*

- Current status – water demand, irrigated area, food production, efficiency and productivity of water use
- Current issues and challenges with water resources and irrigation development worldwide
- Ways forward

#### *(ii) Role of the international funding agencies in irrigation development*

- Who funds irrigation development?
- Funding mechanisms
- Insights into international funding organisations

#### *(iii) Economics of irrigation*

- Key stakeholders – farmers, government, donors.
- Financial and economic analysis
- Benefits and costs
- Comparison of rainfed and irrigated agriculture

### Session II: Fundamentals of Irrigation

#### *(i) Components of irrigation and drainage schemes*

- Overview of basic components
  - Climate and soils – rainfall, evapotranspiration, soil types, etc.
  - Physical components – layout, canals, structures, etc.
  - Agriculture – crop types, water needs, etc.
  - Socio-economic components – farmers, communities, etc.
  - Organisational structures – government structures and organisation, farmer organisations, water users associations, etc.

#### *(ii) Water resources, hydrology and irrigated agriculture*

- Sources of water for irrigated agriculture
- Water resources uses, management and allocation
- Temporal and spatial variability in water resource availability
- Conjunctive use of surface and groundwater resources

#### *(iii) Determining irrigation water requirements*

- Basic components influencing crop and irrigation water requirements
- Calculating crop and irrigation water demands
- Determining irrigation water requirements – Exercise using FAO CROPWAT program

### Session III: Design, Operation and Maintenance of Irrigation Systems

#### *(i) Design of irrigation and drainage systems*

- Design stages – New and rehabilitation
- Design components
- Planning and design processes
- Design for management – canal control and measurement

***(ii) Irrigation techniques – Applying water to the crops***

- Surface and flood irrigation of rice
- Sprinkler and drip irrigation
- Precision irrigation
- Highly mechanised centre pivots
- Trickle irrigation

***(iii) Operation and maintenance – how to make it work***

- Operating I&D systems
- Maintenance of I&D systems
- Asset management and sustainability
- Costs of O&M

## **Session IV: Management Structures and Way Forward**

***(i) Management structures for irrigation***

- The need for management
- Government management structures and organisations
- Water users management structures and organisations
- Current issues in management of I&D systems
- Possible ways forward – Management of change

***(ii) The way forward – Improving efficiency and releasing water for other uses and users***

- Pressure on available water supplies
- Potential impacts of climate change
- Improving irrigation efficiency and productivity to release water for other uses
- Issues to be addressed and overcome

## Timetable

### Day 1 – Thursday 22<sup>nd</sup> October

Timing	Topic	Presenter
<b>09:30 - 10:15</b>	<b>Registration</b>	
10:15 - 10:30	Welcome and course introduction	Martin Burton
<b>Session I: The Role and Impact of Irrigation in Global Agriculture</b>		
10:30 - 11:15	Irrigated agriculture and water use: The Global Picture	Chris Finney
<b>11:15 - 11:30</b>	<b>Coffee/tea break</b>	
11:30 - 12:15	Role of international funding agencies in irrigation development	Martin Burton
12:15 – 13:00	Economics of irrigation	Chris Finney
<b>13:00 – 14:00</b>	<b>Lunch</b>	
<b>Session II: Fundamentals of Irrigation</b>		
14:00 – 14:30	Components of irrigation and drainage schemes	Martin Burton
14:30 – 15:30	Water resources, hydrology and irrigated agriculture	Steve Parsons
<b>15:30 – 15:45</b>	<b>Coffee/tea break</b>	
15:45 – 16:45	Determining irrigation water requirements	Derek Clarke
16:45 – 17:30	Determining irrigation water requirements - Exercise	Derek Clarke / Martin Burton

### Day 2 – Friday 23<sup>rd</sup> October

Timing	Topic	Presenter
<b>Session III: Design, Operation and Maintenance of Irrigation Systems</b>		
09:30 – 11:00	Design of irrigation and drainage systems	Adrian Laycock
<b>11:00 – 11:15</b>	<b>Coffee/Tea break</b>	
11:15 – 12:45	Irrigation techniques – Applying water to the crops	Malcolm Dent
<b>12:45 – 13:45</b>	<b>Lunch</b>	
13:45 – 15:15	Operation and maintenance – how to make it work	Alan Beadle
<b>15:15 – 15:30</b>	<b>Coffee/tea break</b>	
<b>Session IV: Management Structures and Way Forward</b>		
15:30 – 16:15	Management structures for irrigation	Martin Burton
16:15 – 17:00	The way forward – Improving efficiency and releasing water for other uses and users	Bruce Lankford
17:00 – 17:15	Course closure and presentation of certificates	Martin Burton / Alan Beadle

## Resource persons



**Chris Finney** is an agricultural and water resources economist who has spent many years working in development consultancy in some 35 countries in Asia, Africa, Latin America and Europe, mainly as an employee of two major consulting firms and then, after his retirement in 2001, as a freelance consultant. He has particular experience in irrigation planning and analysis in most of the developing world's major irrigation regions, including South and Southeast Asia, the Nile Basin, Central Asia and China, as well as in Sub-Saharan Africa.



**Martin Burton** is a specialist in irrigation water management and institutional development, with over 30 years' experience in some 30 countries in Europe, Africa and Central, South and South East Asia. He has worked in both large and small consulting firms, and for 14 years lectured and supervised research in irrigation management at the Institute of Irrigation and Development Studies, University of Southampton. He currently works as an independent consultant, mostly for the World Bank and Asian Development Bank in India. In 2011 he was part of a small team working on the National Water Resources Framework Study as an input to the 12<sup>th</sup> Five Year Plan (2012-17), and was recently Team Leader of the ADB-funded National Water Use Efficiency Improvement Study preparing a US\$500 million, 12-year multi-tranche project to improve the water use efficiency and productivity on major and medium irrigation schemes in India. He is the author over 40 papers and journal articles and two books - "Irrigation Management: Principles and Practices" published in 2010 and "Irrigation and Drainage Performance Assessment: Practical Guidelines" (co-author), both published by CAB International.



**Steve Parsons** is a civil engineer with extensive experience in water resources development and hydrology of irrigated areas in a career that has spanned 33 years working with Mott MacDonald and spells working at CEH Wallingford and at University of Newcastle upon Tyne. He has provided hydrological analysis for a large number of irrigation schemes, and provided analysis for a number of water resources assessments and flood management projects mostly in South Asia, central Asia and Eastern Europe. Most recently he has spent 5 years as chief technical advisor to the Ministry of Water Resources in India for the World Bank funded Hydrology Project Phase 2.



**Derek Clarke** is a lecturer in Civil Engineering in the Faculty of Engineering and the Environment at the University of Southampton. He led the team that wrote the first Windows version of CROPWAT, the United Nations' standard design software for irrigation water use. His research includes irrigation water estimation and water management in canal systems, water resources, shallow groundwater and soil-vegetation impacts on slope stability. Other interests include simulation of tides and floods in estuaries and the impact of sea level rise on flood risk, including sea level change implications for the UK's New Nuclear Build programme.



**Adrian Laycock** is an irrigation and water resources engineer with 45 years' experience in 30 countries. He has worked on the design and construction of numerous irrigation schemes of all sizes, with special expertise in design of canals, dams and related structures. He runs a small consulting company based in Scotland and currently involved in the development of small-scale hydropower. He is the author of "Irrigation Systems: Design, Planning and Construction", published in 2007 by CAB International as part of their publication series on irrigation and irrigated agriculture.



**Malcolm Dent** has 24 years' experience with international engineering consultancy organizations in the fields of general civil, water and wastewater, environmental and irrigation engineering, specializing in engineering feasibility studies, detailed design, construction supervision, project management, co-ordination, and monitoring of water supply, wastewater, irrigation, river rehabilitation, flood control and drainage projects. Malcolm has undertaken project assignments in UK, Bhutan, Albania, Egypt, Caribbean, Saudi Arabia, Latvia and Romania. Malcolm also has experience in commissioning and training of operation and maintenance staff for water and irrigation projects.



**Alan Beadle** is an independent consultant specialising in asset management for public and private utility companies, including operation and maintenance planning for irrigation systems. He has spent over 40 years working in Europe, Africa, Central, South and South-East Asia. In the UK he has worked in water and sanitation, railways and power generation. Overseas he has worked almost exclusively for government agencies managing large scale surface irrigation and drainage systems. He has helped to develop and present training programs on irrigation management and has published several papers on different aspects of the subject.



**Bruce Lankford** is Professor of Water and Irrigation Policy at the School of International Development, University of East Anglia, UK. He has worked for more than 30 years in the fields of irrigation and water resources management, starting in Swaziland in 1983 but with also substantial experience in East Africa. His main research and advisory work covers irrigation infrastructure and management plus water policy in Sub-Saharan Africa. He was the sole author of the 'irrigation infrastructure' contribution to the Commission for Africa. Other main interests cover the use of games in natural resource management, resource use efficiency, water security metrics, river basin management, water allocation and ecosystem services. He has recently been responsible for the publication of two books on water security and resource efficiency. He is a co-Director of the UEA Water Security Research Centre, a Fellow of the Institution of Civil Engineers and between 2011-2014 was the Chair of the Irrigation and Water Forum.