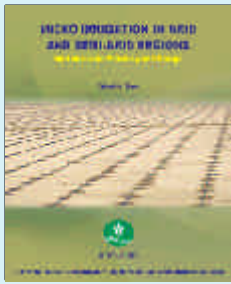


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Irrigation and Drainage

The Journal of the International Commission on Irrigation and Drainage

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ICID has for half a century been the main organization for the global dissemination of experience and new ideas in the quest for the sustainable use and protection of water and land to meet the world's increasing demand for food and fibre.



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1. Micro Irrigation in Arid and Semi-Arid Regions - Guidelines for Planning and Design

Author : Moshe Sne (Israel)

September 2006; Paper bound; 126 pp+ ix; ISBN : 81-89610-09-0

Price : ICID Members and Booksellers: US\$ 30; Non-ICID Members: US\$ 60

Over the past three decades, micro irrigation as a technology has matured into a reliable water and fertigation management system for crop production. The usage of micro irrigation is increasing world over, especially in arid and semi-arid regions as an effective water conservation and demand management measure to cope up with the increasing scarcity of water in agriculture. The micro irrigated area grew gradually from 1.1 million ha in 1986 to about 3.0 million ha in 2000. Today, the micro irrigation is practiced in more than 70 countries covering an area of over 6 million ha showing the doubling of area just in the last six years.

Based on the initiative of Working Group on On-Farm Irrigation Systems (WG-ON-FARM), the Central Office ICID in collaboration with the Israel National Committee on Irrigation and Drainage (ISCID) brought out these guidelines.

The book contains 14 chapters and provides information on the latest developments in micro irrigation system components, practical aspects of water treatment and filtration, fertigation, monitoring and control, and maintenance of micro irrigation systems. Israel has been a pioneering country in the field of pressurized irrigation technology, especially in micro irrigation. Mr. Moshe Sne, the author of the book has a vast experience in the planning, designing and implementation of micro irrigation systems. The book has a sizeable illustrations and tables.

The step by step procedure of planning and design of micro irrigation system for variety of crops are given in a scientific manner in a lucid language with some practical examples.

This guideline will be a valuable reference book for irrigation engineers, practising professionals in water management, students, farmers, manufacturers and all those dealing with the subject of micro irrigation.

2. Planning and Designing of Micro-Irrigation in Humid Regions

Author : Masaharu Kuroda (Japan)

August 2005; Paper bound; 32 pp+ viii; ISBN : 81-89610-01-5

Price : ICID Members and Booksellers: US\$ 10; Non-ICID Members: US\$ 20

The publication deals with all aspects of micro irrigation system like planning and design taking into consideration the special characteristics viz., climate, crops, farming systems and cropping patterns, etc. pertaining to the project area. It summarizes information about 'on-farm micro irrigation' from published manuals and guidelines dealing with upland irrigation in Japan, with particular reference to humid areas. It provides information on computation of consumptive use/crop water requirements in humid climate and different layouts of micro irrigation with special reference to Japanese situation.

For demonstrative purposes, the author has provided a detailed mathematical analysis of planning and designing of a farm pond.

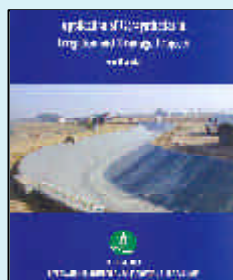
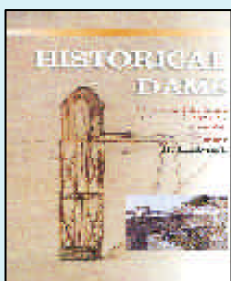
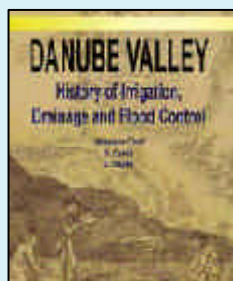
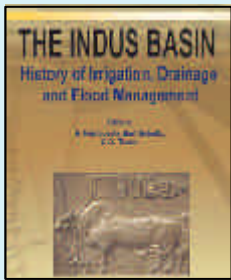
3. Manual on Planning of Structural Approaches to Flood Management

Author – J. van Duivendijk (The Netherlands)
Publisher : International Commission on Irrigation and Drainage (ICID)

March 2005; Paper bound; 114 pp + X; ISBN : 81-85068-89-5

Price : ICID Members and Booksellers: US\$ 20; Non-ICID Members: US\$ 40

Flood Management (or flood risk management) concerns all actions related to the control of floods, the mitigation of flooding and, after such flood control and mitigative measures have been implemented, the management of the residual risk of flooding. In order to decide



on an optimum solution of flooding problems, it is necessary to know the extent of damage caused by floods of different magnitudes/probabilities. A logical method of assessing such damage for use in the selection of a flood protection system is presented in this Manual.

An effort has been made to formulate recommendations for the application of a certain return period as a function of the considerations mentioned in the Manual. Advantages and disadvantages of a standard level of protection have been mentioned. Reasons for adopting a certain level of protection for a certain area (such as loss of human life), has been discussed including related political, economic or psychological considerations.

Further, the use of hydrodynamic mathematical models of the deterministic type for carrying out flood management has been described. The purpose and effectiveness of certain mathematical models for understanding the flooding phenomenon for studying and testing flood control measures and, finally, for calculating various flood parameters has also been described.

4. Application of Geosynthetics in Irrigation and Drainage Projects

Author – Herve Plusquellec (USA)

Publisher : International Commission on Irrigation and Drainage (ICID)

September 2004; Paper bound; 79pp; ISBN : 81-85068-88-7

Price : ICID Members and Booksellers: US\$ 15; Non-ICID Members: US\$ 30

The book provides information on the wide range of geosynthetics and their potential application to irrigation and drainage projects. The controversial issue of lining or not irrigation canals and the design and construction issues of lining with conventional hard materials or with the use of geosynthetics is discussed. Special attention is given to the techniques to line existing canals with minimum interruption of irrigation service with the use of geocells, concrete-filled mattresses or field fabricated geocomposite for example. Finally the book discusses the selection of geomembranes based on the technical service requirements-and not purely on cost considerations-and discusses the two main procurement methods based either on material-specific or performance-specifications.

The book contains more than 20 coloured photographs of actual installations and use of geosynthetics in various irrigation projects world over. The book provides a list of international organizations involved in the development of geosynthetics and providing services to the industry and to their clients, model of performance-type technical specifications for the supply and installation of geomembranes, and technical specifications for the supply of laboratory equipments.

This book is of great interest to various

agencies dealing with execution of irrigation and drainage projects, irrigation and drainage engineers, planners, and financing and research institutions. It is hoped that it will stimulate consideration of the use of geosynthetics in upgrading existing irrigation systems in need of rehabilitation and modernization. The book will be useful, particularly for developing countries where its application is not keeping pace with the development of geosynthetics industry but massive investments are taking place for modernization/rehabilitation of irrigation and drainage systems.

5. Danube Valley : History of Irrigation, Drainage and Flood Control

Edited by G. Csekö and L. Hayde

January 2004, ISBN : 81-85068-85-2

Price : Non-Members US \$ 150; NCs/ Members and Booksellers US \$ 75

River Danube, also called variously as Donau, Dunaj, Duna, Dunav or Dunarea in different countries, originates in the high Schwarzwald massif and flows for 2,857 km across Europe to meet the Black Sea and traverses on its way through glacier-covered mountains, karst formations, forests, highlands and uplands, plateaus with deeply carved river valleys and plains as an international waterway connecting nine (previously seven) countries. With its 817,000 sq km catchment area, it is ranked 25th in the world and length- and discharge wise the second largest river (after Volga) in Europe, crossing 22 geographical latitudes joining nine countries - Austria, Bulgaria, erstwhile Czechoslovakia (covering Bohemia and Slovakia since 1993), Germany, Hungary, Romania and former Yugoslavia (covering Croatia and Serbia since 1989).

This book presents a chronological evolution of the history, art, science and technique of irrigation, drainage and flood management in the riparian countries of Danube river, viz., Austria, Germany, former Czechoslovakia, Hungary, former Yugoslavia, Bulgaria and Romania from the olden times to the period up to 1980.

6. The Indus Basin : History of Irrigation, Drainage and Flood Management

Edited by H. Fahlbusch, Bart Schultz and C.D. Thatte

February 2004, ISBN : 81-85068-77-1

Price : Non-Members US \$ 140; NCs/ Members and Booksellers US \$ 70

This publication provides a historical picture of the past and present of the Indus Basin covering an area of 1.15 million sq km. The mighty Indus river, originating at a height of 5,494 +MSL near Mansarovar lake in Tibet in the Himalayas, flows for 2,880 km to meet the Arabian Sea. This is the sixth largest river of the world whose agriculture-centred civilization belongs to the fifth millennium BC, only second to that of

Euphrates/Tigris of 7th millennium, but older than Nile's of 4th millennium, or that of Huang Ho (Yellow river) of 2nd millennium. In terms of water carried, the Indus flow is three times Nile's, ten times Colorado's and equal to Columbia's.

The basin is home to an internationally acclaimed water sharing accord, called the Indus Water Treaty, signed between India and Pakistan in 1960 that has survived the test of time. The large infrastructure development in the basin comprising dams, barrages, canals, minors etc. has helped in transformation of the basin as a bread basket for the two countries. Constantly improving command area development and management, besides on-farm developmental works, have imparted better productivity in the region. The irrigation system in the Indus basin is today perhaps world's largest integrated and physically contiguous system, in a densely populated region that crossed a population figure of 196 million in 1991.

7. CD-ROM Version of Multilingual Technical Dictionary

Prepared in 2002 (Revised Edition) by ICID Central Office

ISBN : 81-85068-78-X

Price : Non-Members US \$ 50; NCs/ Members and Booksellers US \$ 25

This CD-ROM will be highly useful for engineers, researchers, students, professionals, planners, designers, academics and all others related with the field of irrigation and drainage. Highlights of Dictionary are: Definitions of more than 9200 technical terms related to irrigation, drainage, flood management, environment, river training and allied disciplines; Search option for locating definitions from keywords and from chapters/topics of interest; Advanced Search Options include full text search option with all the words and exact phrases (by using standard logical operators); Option to view the selected language of your choice; Any term definition can be printed/copied; Option to download/updates terms from ICID website as and when available; Over 550 definitions have been illustrated with hyperlinked sketches for clarity; and many more user-friendly options to help the user in getting the right information with a mouse click.

After the first edition of ICID Multilingual Technical Dictionary (1967), new techniques have developed and new practices in design, construction, operation and maintenance of irrigation, drainage and flood control works have come into vogue. Computer aided system analysis has further revolutionized the water and land management strategies. Keeping in view this, Multilingual Technical Dictionary, has been revised covering latest fields of application. The dictionary is available in book form (1996 edition) as well as on CD-ROM.

8. Historical Dams

Edited by Dr. Henning Fahlbusch (Germany)

Sept. 2001, ISBN : 81-85068-76-3

Price : Non-Member US \$ 130; NCs/ Members and Booksellers US \$ 65

On the eve of its 52nd Annual International Executive Council Meeting and 1st Asian Regional Conference in Seoul, Korea, ICID has brought out a History publication "Historical Dams" edited by Dr. Henning Fahlbusch, Chairman, ICID Working Group on History of Irrigation, Drainage and Flood Control (WG-HIST) comprising 19 chapters contributed by eminent international experts and historians.

This publication presents not only the history of dams, historical dams, and the history of development of technologies for various types of dams, but it also highlights the skills and techniques deployed by the builders since olden times.

The description of the oldest large earthen dam - 'Sadd-el-Kafara' built around 2700 BC is a poem of spirited imagination translated into undaunting action. An unprecedented flood may have washed away the structure, but in turn the catastrophe generated a good learning experience for future. Storage created in Fayum Depression at the time of Middle Empire (2122-1786 BC) in Egypt; water management in antiquity in the Urartu Kingdom (850-600 BC); development of 'Qanats', a means to use groundwater in Iran; dam-building activity in Spain, Central Europe, and by Nabataeans, old Sudanese Kush Empire, and the old Kingdom of Saudi Arabia; development of the Mining Ponds in Upper Harz in Germany; and construction of various types of dams during the Seljuk and Ottoman periods, and in Spain and Danube area of Europe present an interesting historical narration.

History is not a mere transition to posterity, it is a great teacher to those who strive to transform the society for the better. The efforts of past builders and engineers to develop innovative, safe and sound engineering designs are a fine exhibition of their irrepressible zeal to favourably manoeuvre the vagaries of Nature for overall socio-economic development. This publication presents a fascinating insight into the earlier techniques of dam construction - not so refined from present standards, but wellnigh innovative. Covering the history of dam building in several of present day countries, this book is a useful and authentic compilation of hydraulic engineering feats for storage of water through structures of various types and sizes.

9. Canal Operation Simulation Models

(Provisional Catalogue of Models Currently Available)

Compiled by Jean Goussard, France

Sept. 2000, ISBN : 81-85068-73-9

Price : Non-Member US \$ 20; NCs/ Members and Booksellers US \$ 10

Canal operation simulation models are acknowledged as very efficient tools for improving the design and operation of irrigation canal systems. The development of low-cost powerful personal computers has given access to computer simulation to a large number of potential users. Typically, the use of such models can be of great help for the comparison of various design alternatives, for the development and tuning-up of operational strategies and automatic control algorithms, and for operation or training.

In view of this, the erstwhile Working group on Construction, Rehabilitation and Modernisation of Irrigation Projects (WG-CONST), decided at its 1996 Cairo Session to prepare a catalogue of the canal operation simulation models currently available to potential users. The present document is a synthesis of the responses to a questionnaire that was sent to all national Committees of ICID and to organizations and individuals involved in development or use of such programs.

This report includes a description of 19 models that are currently in use around the world to assist with the operation of canal distribution systems. The document provides basic information on each of the models and details of model developers or licensing agents from whom the models can be obtained, and will be an invaluable source of information to those system designers and operators worldwide seeking to improve water delivery services.

10. ICID Survey on Funding of Operation, Maintenance and Management of Irrigation and Drainage Projects

Author : Peter S. Lee, UK

October 2000, ISBN : 81-85068-75-5

Price : Non-Members US \$ 30; NCs/ Members and Booksellers US \$ 15

This report is the result of the survey undertaken by the Working Group on Development and Management of Irrigation Systems (WG-DMIS). It has been clear for some time now that there is a close relation between the institutional and management arrangements and the performance of irrigation and drainage systems. This second survey of OM&M funding revealed many important findings about the structure of the irrigation authorities charged with the management of irrigation and drainage. It also reveals some important relations between certain types of organisations and their ability to operate and maintain irrigation and drainage infrastructure to provide services in a sustainable manner. As we enter a new century of irrigation and water resources development institutional performance will play a critical role in managing water for sustainable agriculture. This publication will be of

great interest to irrigation and drainage practitioners, researchers and managers with a particular interest in institutional development.

11. Remote Sensing and Geographic Information Systems in Irrigation and Drainage – Methodological Guide and Applications

Edited by Alain Vidal, France

Sept. 2000, ISBN : 81-85068-72-0

Price : Non-Member US \$ 50; NCs/ Members and Booksellers US \$ 25

Satellite remote sensing and geographic information systems have been used for several years with various degrees of success in irrigation system management. There is an urgent need to provide irrigation and drainage managers and professionals with a guide that allows them to understand and master these tools, and to evaluate their appropriateness to their specific management problems.

This methodological guide was initiated by AFEID (Association Francaise pour l'Etude des Irrigations et du Drainage) for the International Commission on Irrigation and Drainage. It has now been published after several years of collaborative effort at national and international levels, and aims to fill the information gap previously identified. Following the introduction which provides the reader with an overview of how to use the guide depending on their needs, the main text is structured into three sections: the basic elements on remote sensing and on its integration into GIS; a methodology for establishing geographic information base for an irrigation system, which represents a consensus of opinion in the AFEID working group; and examples of applications of remote sensing and GIS.

12. Guidelines for Rehabilitation and Modernization of Irrigation Projects

Author : William Price, USA

August 1999, ISBN : 81-85068-71-2

Price : Non-Members US \$ 20; NCs/ Members and Booksellers US \$ 10

Irrigated agriculture contributes more than one third of the food supply to the world population and it will have to continue to play a critical role in the coming century. Although the total irrigated area of the world is increasing, per capita availability of irrigated area is dwindling due to rapid population growth. Many irrigation projects built in the past are no longer irrigating their command area as originally envisaged. Construction cost of new irrigation schemes is increasing. Thus, improvement of productivity both, per unit of land and per unit of water are becoming equally important. Rehabilitation and/ or modernization of irrigation projects has been considered as one of the alternative to achieve afore-said twin objectives.

The concepts of Rehabilitation and Modernization are not new ones. Both the strategies have been and are being implemented in numerous irrigation projects world-wide. Since Rehabilitation and Modernization requires substantial investment, the concerned planning and implementing authority should have a clear picture about its necessity and cost effectiveness.

The preparation of this Guideline was initiated by Working Group on Development and Management of Irrigation Systems (WG-DMIS).

The document is prepared with a view to providing Guidelines and sort of a checklist of several basic factors which need to be considered by the personnel involved in rehabilitation and modernization of irrigation projects, so as to arrive at an appropriate management decision. It is obvious that, each project has site specific issues. The Guidelines therefore will have to be used in a broader context.

It is hoped that this document will be of great assistance to those faced with the task of planning and implementing the rehabilitation and modernization of irrigation schemes, the world over.

13. CD-ROM ICID @ 50

Prepared in 2000 by ICID Central Office

Price : Non-Members; NCs/ Members and Booksellers US\$ 5 (Handling charges)

This CD gives detailed information about International Commission on Irrigation and Drainage (ICID) and answers following questions :

- What is ICID?
- Who are its members?
- How it works?
- What is its contribution?
- How it meets challenges?

This handy computer software can be very useful for persons/ organizations interested in knowing about ICID and participation in its activities.

14. Manual on Non-Structural Approaches to Flood Management

Brought out by : ICID - In Golden Jubilee Year: 1999-2000, Published in August 1999, ISBN : 81-85068-70-1

Price : Non-Members US \$ 40; NCs/ Members and Booksellers US \$ 20

Various approaches are available for flood management. These comprise basically adjustments, adoption of one or more approaches being dictated by the situation, one is called upon to tackle. The attempts to manage the floods can be classified into following four main groups :

- (1) Attempts to modify the flood;
- (2) Attempts to modify the susceptibility to flood damage;
- (3) Attempts to modify loss burden; and
- (4) Preparing for and bearing the loss.

The first one calls for protection through physical structures and is termed a 'structural approach' whereas the other three, collectively are known as 'non-structural approaches'. The present manual discusses the non-structural approach and is an outcome of arduous effort put in by the ICID's Working Group on 'Non-structural Aspects of Flood Management'.

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