

Drainage: an annotated guide to books and journals

G. Naber

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Contents

Preface	5
Reference structure	7
Sources of information	9
Abstract journals	10
Journals	11
Bibliographies	13
Directories	14
Dictionaries	15
Books - 1982 -	16
Books - 1981 -	16
Books - 1980 -	18
Books - 1979 -	22
Books - 1978 -	23
Books - 1977 -	25
Books - 1976 -	27
Books - 1975 -	28
Books - 1974 -	29
Books - 1973 -	31
Books - 1972 -	32
Books - 1971 -	33
Books - 1970 -	33
Reclamation of salt-affected soils	34

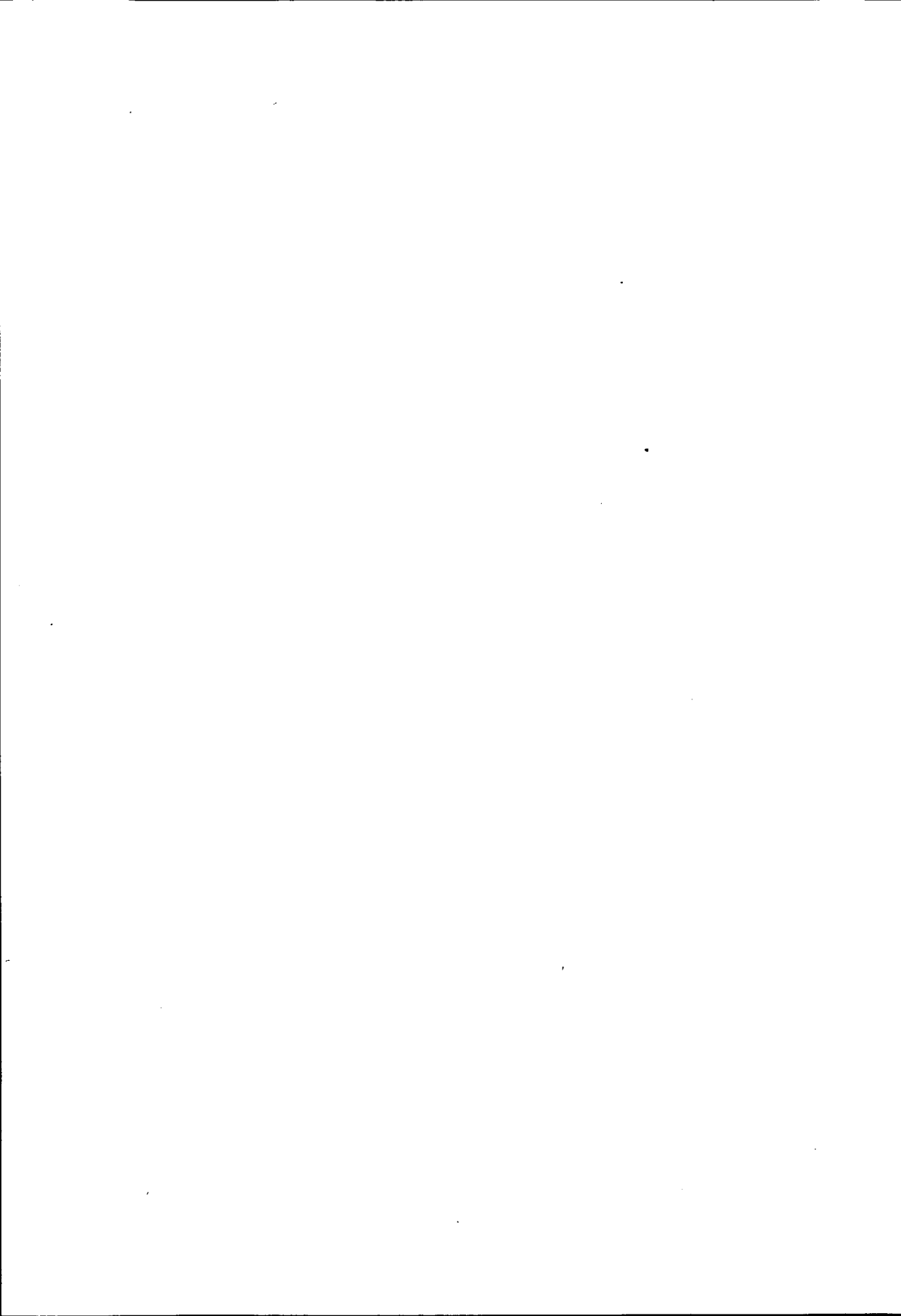


Preface

A scientist faces a formidable task on keeping track of the ever-increasing amount of literature. For this reason, ILRI's annual International Course on Land Drainage includes a visit to the Staring Building Library for a two-hour lecture on how literature is catalogued, how it is stored, and how it can be retrieved. To further help the Course participants, *Drainage: An Annotated Guide to Books and Journals* was compiled. The Guide is a selective bibliography of books dealing with drainage in French, English, and German issued since 1970. The books are listed by year of publication, beginning with the most recent. Nearly every book listing is accompanied by an abstract or a description of its contents. Some theses are included, although without annotation as their titles are a fairly complete description of their contents. A special section on reclamation of saline soils using drainage can be found at the end.

Since the Guide is necessarily somewhat limited, no individual books or journal articles published before 1970 are listed. To compensate for this omission, however, several bibliographies which do comprise these years are included. Literature published after 1970 is available by on-line retrieval, a system which allows direct access to a host computer's data bases by means of a telephone link-up with a user terminal in the Staring Building Library. For those who wish to continue exploring the field of land drainage, the following sources can serve as a point of departure for obtaining more information:

- Other bibliographies (there are even bibliographies of bibliographies);
- Directories;
- Abstract journals;
- Scholarly journals.



Reference structure

Author (Last name first, then initials).

Title

Place of publication: Publisher, date of publication.

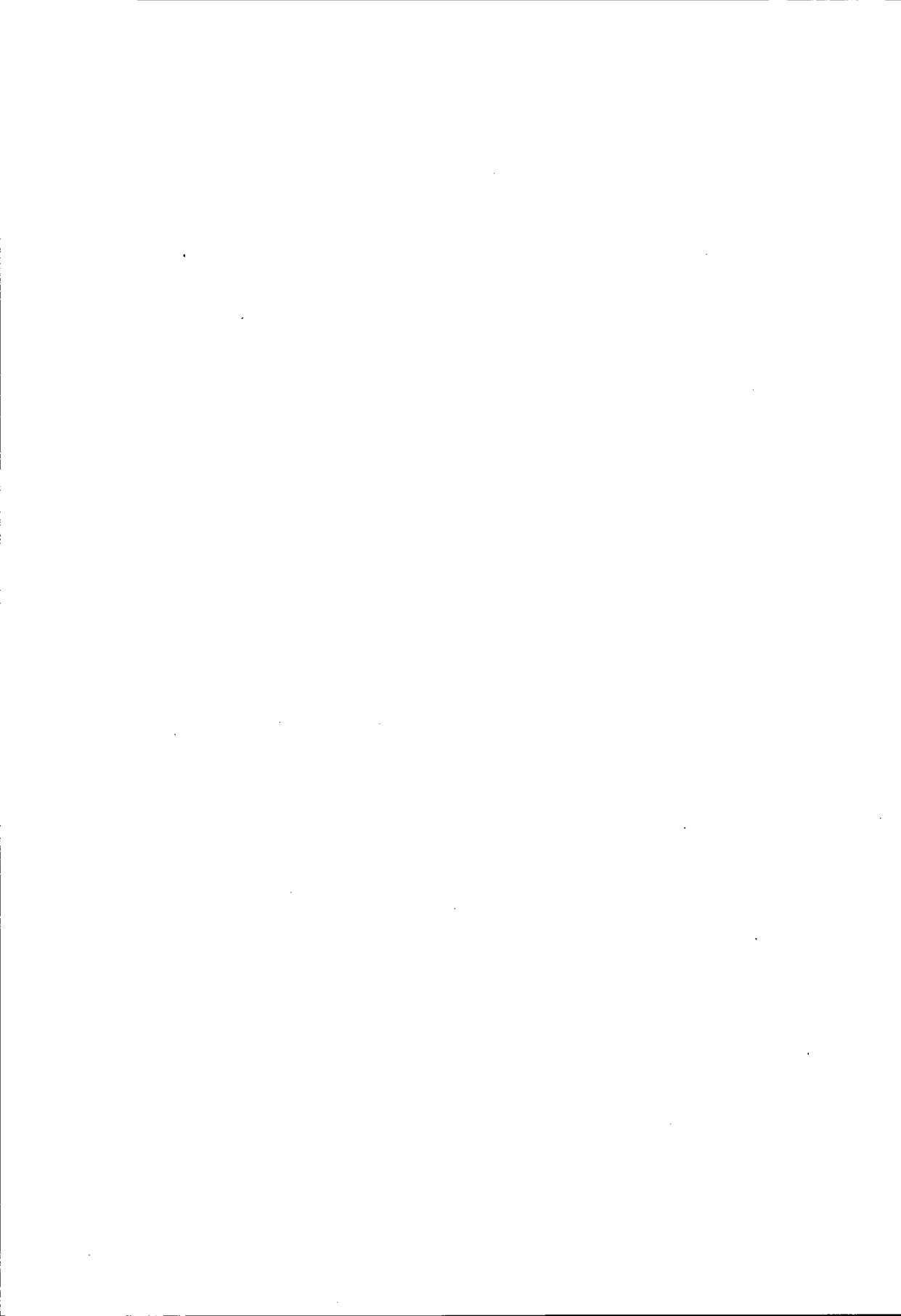
– Number of pages. – (Name of serial publication; Number).

Library signature

(Abstract)

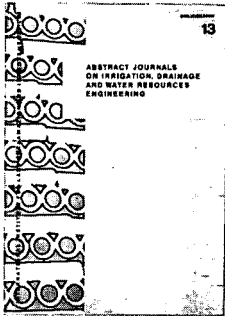
Abbreviations used in the guide

I.C.I.D.	International Commission on Irrigation and Drainage
A.S.C.E.	American Society of Civil Engineers
A.S.A.E.	American Society of Agricultural Engineers
U.S.D.I.	U.S. Department of Interior
L.H.	Landbouw Hogeschool (Agricultural University)
U.S.D.A.	U.S. Department of Agriculture
C.A.B.	Commonwealth Agricultural Bureaux
C.S.S.R.I.	Central Soil Salinity Research Institute
FIBOWA	The Library of the Staring Building

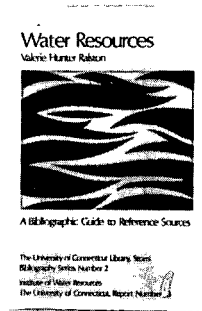


Sources of information

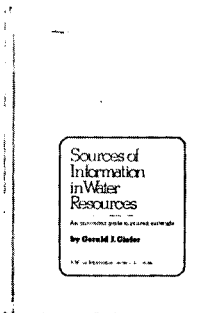
Abell, L.F.
**Abstract journals on irrigation, drainage
and water resources engineering: a se-
lected bibliography**
Wageningen: I.L.R.I., 1971. – 47 p. –
FIBOWA 1/83(13)



Ralston, V.H.
**Water resources: a bibliographic guide to
reference sources**
Storrs: University of Connecticut, 1975.
– 123 p. – (Report. University of Con-
necticut; no. 23).
FIBOWA 1/506

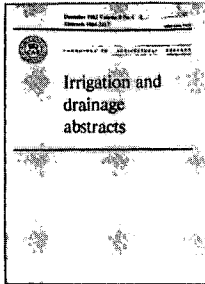


Giefer, G.J.
**Sources of information in water resources:
An annotated guide to printed materials**
New York: Water Information Center,
1976. – 290 p. –
FIBOWA 1/528

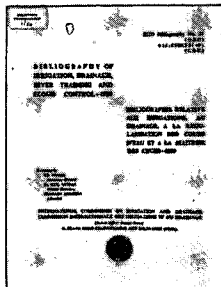


Abstract journals

Irrigation and Drainage Abstracts
Central Sales Branch, commonwealth
Agricultural Bureaux
Farnham Royal, Slough, S1 2 3 BN,
U.K.



**Bibliography of Irrigation, Drainage,
River Training and Flood Control**
International Commission on Irrigation
and Drainage
48 Nyaya Marg, Chanyakyapuri, New
Dehli-110021, India.

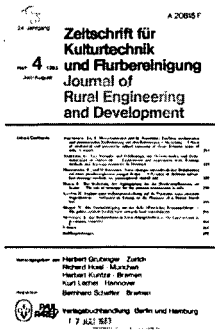


Journals

The Bibliography of Irrigation, Drainage, River Training, and Flood Control, published each year by the ICID, contains a large list of journals where fine articles dealing with drainage can be found. Some of these journals are mentioned here:

Journal of the Irrigation Drainage Division: Proceedings of the ASCE
American Society of Civil Engineers
345 East 47th Street; New York, NY 10017, USA.

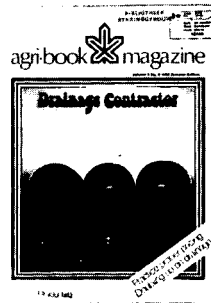
Zeitschrift für Kulturtechnik und Flurberreinigung
Verlag Paul Parey
Lindenstrasse 44-47, D-1000, Berlin 61, BRD.



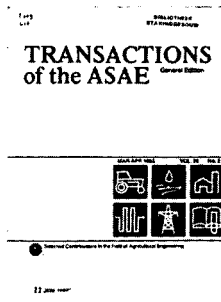
Agricultural Water Management: An International Journal
Elsevier Scientific Publishing Co.
P.O. Box 211, NL/1000 AE Amsterdam, The Netherlands.



Drainage Contractor
Agricultural Information Service, Ltd.
Box 1060, Exeter, Ontario N0M 1S0, Canada.



Transactions of the A.S.A.E.
American Society of Agricultural Engineers
2950 Niles Road, St. Joseph, MI 49085, USA.



Journal of Hydrology
Elsevier Scientific Publishing Co.
P.O. Box 211, NL/1000 AE Amsterdam, The Netherlands.

I.C.I.D. Bulletin
International Commission on Irrigation and Drainage
48 Nyaya Marg, Chanyakyapuri, New Dehli-110021, India.

Soil Science Society of American Journal
Soil Science Society of America
677 South Segoe Road, Madison, WI
53711, USA.

Wasser und Boden
Verlag Paul Parey
Spitalerstrasse 12, D-2000 Hamburg 1,
BRD.

Wasserwirtschaft, Die
Franckh'sche Verlagshandlung
Pfizerstrasse 5-7, 7000 Stuttgart 1, BRD.

Agricultural Engineering
American Society of Agricultural Engi-
neers
2950 Niles Road, St. Joseph, MI 49'85,
USA.

**Drainage-Revue Semestrielle du Syndicat
National Professionnel des Entrepreneurs
de Travaux de Drainage**
45270 Auvilliers en Gatinais, Bellegrade,
France.

Bibliographies

Crook, C.B.

Drainage of agricultural land: an annotated bibliography of selected references 1956-1964

Washington: USDA, 1968. – 524 p. – (Library list. National Agricultural Library: no. 91).

FIBOWA 1/335

Davis, E.G. and M.L. Gould

Drainage of agricultural land: a bibliography of selected references.

Washington: USDA, 1956. – 200 p. – (Miscellaneous publication. USDA; no. 713).

FIBOWA 1/25

Vries, C.A. de and B.C.P.M. van Baak

Drainage of agricultural land: a bibliography

Wageningen: ILRI, 1966. – 28 p. – (Bibliography. ILRI; no. 5).

FIBOWA 1/83

Directories

Directory of land reclamation and water management organizations in the world

New Dehli: ICID, 1979. – 261 p. –

(Draft).

FIBOWA 1/577

An attempt to list all organizations concerned, either directly or indirectly, with irrigation, drainage and flood control projects, multipurpose and river bank development, and overall planning of water resources. The address of each organization listed is included.

Dictionaries

Kennedy, M.N.

A handbook of irrigation and drainage terms: English-French = Irrigation et drainage: guide pratique des termes, Français-Anglais

Bishop's Waltham: Newhouse, 1981. – 44 p. –

FIBOWA 1/582

Shybladzay, K.K.

Multilingual technical dictionary of irrigation and drainage: Russian-English-French = Dictionnaire technique multilingue des irrigations et du drainage: Russe-Anglais-Français

Moskva: ICID, 1978. – 543 p. –

FIBOWA 1/559

Toyoda, H.

Technical dictionary on irrigation and drainage

Tokyo: Japan International Cooperation Agency, 1977.

– 450 p. – Irrigation and Drainage Course. Uchihara. International Agricultural Training Centre.

FIBOWA 1/537

Papadopoulos, G.E.

Multilingual technical dictionary on irrigation and drainage: Greek-English-French-German = Dictionnaire technique. Multilingue des irrigations et du drainage: Grec-Anglais-Français-Allemand = Fachwörterbuch für Bewässerung und Entwässerung: Griechisch-English-Französisch-Deutsch.

Athens: ICID, 1975. – 1060 p. –

FIBOWA 1/491

Multilingual technical dictionary on irrigation and drainage: English-French-German = Dictionnaire technique multilingue des irrigations et du drainage:

Anglais-Français-Allemand = Fachwörterbuch für Bewässerung und Entwässerung: Englisch-Französisch-Deutsch.

Stuttgart: Franckh'sche Verlagshandlung, 1971. – 948 p. –

FIBOWA 1/386

Books

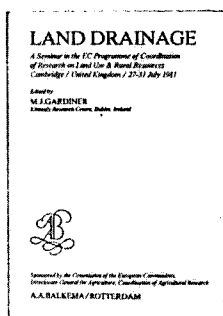
Books - 1982 -

Gardiner, M.J.

Land drainage: a seminar in the EC program of coordination of research on land use and rural resources, Cambridge, United Kingdom, 27-31 July 1981

Rotterdam: Balkema, 1982. - 311 p. - FIBOWA 24/260

Twenty papers by experts throughout the European Community, but particularly from regions where land drainage is a serious problem. Subdivided into main topics: Drainage and reclamation of soils of low permeability; monetary aspects and planning of drainage; drainage in problem areas; research and development. It reports on visit to the Field Drainage Experimental Unit in Cambridge, to the ARC Latombe Laboratory, and to the Field Drainage Farm in Brimstone, Farrington. Conclusions deal with future research and development needs on a European Community-wide basis.



Books - 1981 -

Concaret, J.

Drainage agricole: théorie et pratique. (Agricultural Drainage: theory and practice)

Dijon: Chambre Régionale d'Agriculture de Bourgogne, 1981. - 509 p. - FIBOWA 24/251

Five sections and four appendices deal with the techniques and applications of drainage, equipment and material, drainage networks and their maintenance. The book also includes pedological and hydrological background information, historical and legal aspects, and methods of soil analysis in relation to drainage problems.



DRAINAGE AGRICOLE
Théorie et Pratique



CHAMBRE RÉGIONALE D'AGRICULTURE DE BOURGOGNE

Eggelsmann, R.
**Dranganleitung für Landbau, Ingenieurbau
und Landschaftsbau, 2. Auflage (Subsur-
face drainage instructions, 2nd edition)**
Hamburg: Parey, 1981. – 288 p. –
FIBOWA 24/185(2)

In this second edition new material has been added, e.g. on the ecological aspects of drainage.

Main subject headings are: Water and soils; Field investigations; Drainage methods; Effect of drainage; Hydraulic calculations; Drain design; Drainage material; Drain construction; Drain maintenance.



Framji, K.K. and I.K. Mahajan
**Irrigation and drainage in the world: a glo-
bal review, 3rd edition.**
New Dehli: ICID 1981. – 2 volumes. –
FIBOWA 28/60

Introductory Chapter which reviews in global perspective the object, the role, and development of irrigation and drainage, the demographic trends in less developed and more developed countries vis-à-vis the related food production, the availability of arable land, and development and use of water resources by 2000 A.D. Economics, financing, and appraisal of irrigation and drainage projects are briefly touched upon with some general conclusions at the end.

Material on each country is arranged under the following headings:

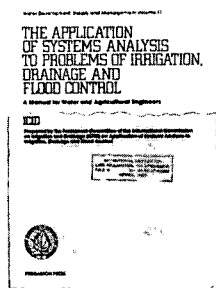
- (1) Physiography, (2) Climate and Rainfall, (3) Population and Size of Holdings, (4) Land Resources, (5) Water Resources, (6) Brief History of Irrigation and Drainage, (7) Irrigation and Drainage Methods Used, (8) Statistics relating to Irrigation and Drainage, (9) Important projects, (10) Field Water Management, (11) Problems relating to Irrigation and Drainage, (12) Present Developments, Future Plans and Potentials, (13) Administration of Irrigation and Drainage Projects, (14) Economics of Irrigation and Drainage Projects, (15) Financing of Irrigation and Drainage Projects, (16) New Technology and its Application, (17) Water Laws and Inter-state Agreements, (18) International Water Agreements and Treaties, (19) Research on Irrigation and Drainage and, (20) Other Features.

Books - 1980 -

The application of systems analysis to problems of irrigation, drainage and flood control: a manual for water and agricultural engineers

Oxford: Pergamon Press, 1980. – 203 p.
– (Water Development, supply and management; vol. 11)
FIBOWA 22/811

Prepared for engineers working on irrigation, drainage, and flood control, this handbook considers general concepts of systems analysis and its use and potential in hydrology, agriculture, irrigation, and water-resources planning.

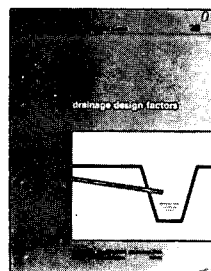


The Drainage Contractor. Black Book II.
Exeter: Agri-Book Magazine, 1980. – 64 p. (Drainage Contractor special number 2).
FIBOWA 24/218

A compendium of manufacturers and distributors of back fillers and drainage machines e.g. wheel-type, chain-type, trenchless machines. A photograph of each machine is accompanied by a description and specifications.

Drainage design factors: 28 questions and answers based on the Expert Consultation on drainage design factors, Rome, 22–29 October 1979

Rome: FAO, 1980. – 52 p. – (FAO Irrigation and Drainage Paper; no. 38).
FIBOWA 32/230(38)
Contents: Drainage investigations; Design criteria and parameters; Engineering; Maintenance; Cost factors.



Armstrong, A.C.
Drainage statistics, 1978–80
Cambridge: Ministry of Agriculture, Fisheries and Food, 1980.
– 68 p. – (Technical report. Field Drainage Experimental Unit. Land Drainage Service; no. 80/1).
FIBOWA 24/112(80–1)

Technical statistics on field drainage in England and Wales for the financial years 1978/79 and 1979/80 are presented, and the overall patterns revealed by the data for the nine year period 1971–80 are discussed. Data on the change in land use as a result of drainage are also presented.

Bailey, A.D., C.W. Dennis, G.L. Harris, and others

Pipe size design for field drainage

London: Ministry of Agriculture, Fisheries and Food, 1980. – 53 p. – (Report. Land Drainage Service; no. 5). FIBOWA 24/240(5)

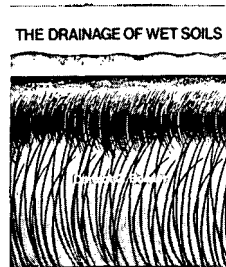
A review of the design criteria used for determining pipe size in field drainage works in England and Wales. Existing drainage coefficients used for the design of subsurface laterals and restricted inlet mains are reviewed and a new approach suggested with rainfall, land use, slope, soil infiltration rate, and type of drainage system as the major determining factors. The available methods for determining surface runoff from small agricultural catchments are reviewed and recommendations made for applying a suitable technique to the design of open inlet piped ditches and culverts. The appropriate design principles for water flowing into and through field drainage pipes are discussed together with other factors including the appropriate allowances for surcharge and silting up. Design charts are given for the determination of pipe diameters for pipes of all readily available materials for laterals, restricted inlet mains, interception drains, open inlet pipe ditches, and pipe culverts.

Biswas, A.K.

Water management for arid lands in developing countries: papers from the training workshop organized by the Ministry of Irrigation, Government of Egypt in cooperation with the United Nations Environment Program, Cairo, Egypt. 214 December 1978.

Oxford: Pergamon, 1980. – 252 p. – (Water development, supply and management; Vol. 13). FIBOWA 26/453

A comprehensive discussion of the physical, economic, social, institutional, and environmental problems of water management for arid lands in developing countries. Special emphasis is given to developing national water management plans tailored to the needs of their specific countries. Includes a chapter on irrigation and drainage project preparation and one on the use of network analysis in planning one of Egypt's main drainage systems.



Bowler, D.G.

The drainage of wet soils

London/ Hodder and Stoughton, 1980. – 259 p. – FIBOWA 24/255

Contents: Soils in Relation to Drainage; The Water Properties of Soils; Hydrology of Drainage Systems; Surveying for Drainage Systems; The Use of Aerial Photography in Farm Drainage Practice; Surface Drainage; Subsurface Drainage; Mole Drainage; The Drainage of Peat Soils; Pumping to Remove Drainage Water; Ditching and Pipe Trenching Machinery; Some Important Management and Maintenance Practices; The Use of Subsurface Drainage Systems for Water Harvesting.

Christoph, F.

Beitrag zur Funktionsprüfung von Dränrohren in Labormodellen natürlichen Masstabes. (Report on performance of drainage pipes in full-scale laboratory models)

Hamburg: Parey, 1980. – 128 p. – (Schriftenreihe des deutschen Verbandes für Wasserwirtschaft und Kulturbau; Heft 47).

FIBOWA 28/34(47)

Drainage materials were subjected to numerous laboratory tests, but the results were difficult to compare. To overcome the problem, a tank was designed to test drainage pipes and materials under uniform flow conditions. The laboratory model and test procedures are described in detail. In addition, methods of measuring entrance resistance, predicting soil inflow into the pipe, and determining the effects on the watertable are given.

Dierickx, W.

Electrolytic study of the effect of openings and surrounds of various permeabilities on the performance of field drainage pipes

Wageningen: Dierickx, 1980. – 238 p. – (Dissertation Wageningen) – (Report. National Institute for Agricultural Engineering; no. 77).

FIBOWA 24/216

Eggleston, J. editor

Irrigation and drainage: today's challenges, ASCE special conference, July 23–25, 1980

New York: ASCE, 1980. – 501 p. –

The topics discussed include maintaining groundwater quality, managing weather-replanning irrigation and drainage systems, production functions related to evapotranspiration, use of nonsaline low-quality waters, and optimizing water conveyance systems.

Guyon, G.

Le drainage agricole: essai de synthèse en 1980 (Agricultural drainage: synthesis test data in 1980)

Paris: Ministère de l'Agriculture, 1980. – 113 p. – (Bulletin technique de Genie Rural; no. 126)

FIBOWA 32/362(126)

This technical report reviews the experiments and trials which have been undertaken since 1960, mainly by the investigators and engineers of the French Ministry of Agriculture.

Specifically, it introduces the methods recommended in the design of land drainage projects, it brings some information on new technological means used in the realization of works, materials, and machines, and it gives an idea of the profitability of drainage projects and their future developments.

Holsambre, D.G. and G. Sinai
A water balance model for drainage of fine-textured soils

Haifa: Israel Institute of Technology, 1980. – 103 p. – Publication. Israel Institute of Technology; no. 320.) – (Annual report. Water management model for drainage of irrigated lands in semi-arid zones: no. 1. pt. 2).
FIBOWA 24/237

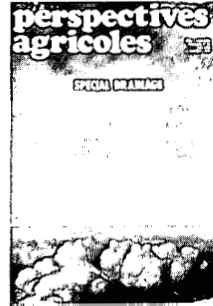
A simple water balance model for sub-surface drainage of fine textured soils was developed, based on an earlier model of S.T. Chieng and R.S. Broughton. The model deals with various horizontal and vertical fluxes i.e. precipitations, ET, drainage-tile flow, runoff, and deep seepage. It also takes into account soil properties and crop requirements. The method of 'successive steady states' was used in predicting the dynamic response of the watertable due to transient incoming fluxes. In the method of successive steady states, a time interval of one day was assumed in order to use steady state spacing equations. At the end of each day, a water balance was calculated and a new watertable position was determined.

Mehier, C.

Perspective Agricoles: (Agricultural Perspectives: Drainage Spécial) Special Drainage

Paris: Prorégie, 1980. – 66 p. – (Perspective Agricoles: Juin no.38)
FIBOWA 24/229

Special issue of the magazine Perspectives Agricoles. Contents: Drainage and its prospects; legal aspects; Preparing a drainage system; choosing the type of drainage; Planning a project; Crops confronted with waterlogging; Cropping techniques; Maintenance of the drainage structures; Maintenance of system performance; Cropping techniques, the Faux-Perche case; Drainage and the future of agriculture.



Sarker, T.K.

Drainage system design

New Dehli: Indian Agricultural Research Institute, 1980. – 193 p. – (Design manual. Water Technology Centre, Indian Agricultural Research Institute; no.1).

A detailed description in both practical and theoretical terms of a drainage system designed in-house for a research farm. The manual is intended both as a guide to the design and construction of similar systems and as a study model.

Suryawanshi, S. and G. Sinai

Use of transient flow concept and crop needs in the design of subsurface drainage systems

Haifa: Israel Institute of Technology, 1980. – 106 p. – (Publication Israel Institute of Technology; no. 319) – (Annual report. Water management model for drainage of irrigated lands in semi-arid zones; no. 1. pt. 1).

FIBOWA 24/244

The design methods of subsurface drainage systems were studied by using spacing equations. Five non-steady state spacing equations (Glover-Dumm, van Schilfgaard, McWorter, Skaggs, and Wesseling) were studied in detail. The validity of these equations was tested for fine-textured soils. Two crop response models were also studied in order to incorporate crop needs into a subsurface drainage design. These models are the SEW 30 as proposed by Sieben, and the SDI concept as proposed by Hiler and Clark. Both the watertable drawdowns and the drain spacings were calculated using the spacing equations. Two field situations were considered: (i) a deep pervious soil in an irrigated field, and (ii) a field of fine-textured soil in winter rainfall seasons.

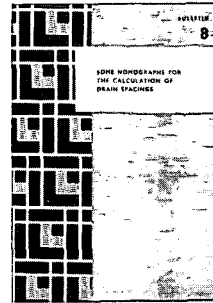
Books - 1979 -

Beers, W.F.J. van

Some monographs for the calculation of drain spacings, 3rd ed.

Wageningen: ILRI, 1979. – 48 p. – (Bulletin. International Institute for Land Reclamation and Improvement; no. 8) FIBOWA 32/108/8)

Also includes nomographs for non-steady flow and for homogeneous soil with an impermeable layer at great depth. In addition, the author elaborates a specific type of nomograph meant to help determine the effect of various factors on a drainage system's performance more accurately.



Green, F.H.W.

Field drainage in Europe: a quantitative survey

Wallingford: Institute of Hydrology, 1979. – 78 p. – (Report. Institute of Hydrology; no. 57).

FIBOWA 32/283(57)

Presented in three sections; the first two are factual accounts of subsurface drainage in the British Isles and on the Continent, while the third extrapolates from existing data to present more detail on the pattern of subsurface drainage. The information is given in both cartographical and tabular form.

Irrigation and drainage in the nineteen-eighties: 1979 Irrigation and Drainage Division specialty conference, July 17-20, 1979, Albuquerque, New Mexico
New York: A.S.C.E., 1979. - 439 p. - FIBOWA 28/219

Collected papers emphasize current developments in irrigation and projections for the 1980's but one on drainage research is also included.

Provisional guidelines for sub-surface drainage of Korea

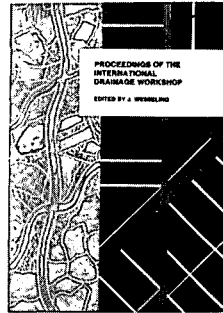
Undipok: 1979. - 74 p. - (U.N.D.P./F.A.O. drainage improvement project) - ROK;no. 75/006)
FIBOWA 24/232

Contents: The purpose of subsurface field drainage in Korea; Drainage as a part of comprehensive water management; Assessment of need for drainage; Theory and design of field pipe drainage; Design of the open channel disposal systems; Drainage materials; Specifications and construction; Operation and maintenance of drainage systems; Economics of subsurface drainage.

Strzepek, K:M.
Planning or agricultural drainage under certainty: a dynamic multi-level approach
Cambridge: MIT, 1979. - 258 p. - (Thesis. Massachusetts Institute for Technology)

Wesseling, J. (ed.)
Proceedings of the International Drainage Workshop, 16-20 May 1978, Wageningen, The Netherlands
Wageningen: I.L.R.I., 1979. - 731 p. - (Publication. International Institute for Land Reclamation and Improvement; no. 25).
FIBOWA 32/109(25)

Fifty-three papers presented at the International Drainage Workshop are included in this book. The papers cover four main topics; design and research, materials, installation methods, and drainage of irrigated lands.



Books - 1978 -

Armstrong, A.C.
A digest of drainage statistics
Cambridge: Ministry of Agriculture, Fisheries and Food, 1978. - 73 p. - (Technical report. Field Drainage Experimental Unit. Land drainage Service; no. 78/7).
FIBOWA 24/112(78/7)

Tables are presented which record technical data relating to all subsurface drainage projects in England and Wales. The tables report these data for the period 1.4.71 to 31.3.78. Includes examples of how the data are used.

Drainage manual, a water resources technical publication: a guide to integrating plant, soil, and water relationships for drainage of irrigated lands
Washington D.C.: U.S.D.I., 1978. – 286 p. –
FIBOWA 24/167

Engineering tools and concepts useful in planning, constructing, and maintaining drainage systems for successful long-term irrigation projects. A ready reference for making accurate estimates of drainage requirements. All methods and techniques covered have proven to be very satisfactory through observed field conditions in irrigated lands throughout the world.

Eggelsman, R.
Subsurface drainage instructions
Hamburg: Parey, 1978. – 283 p. – (Bulletin. National Committee of the Federal Republic of Germany. I.C.I.D.; no. 6).
FIBOWA 24/195
English translation of Dränanleitung für Landbau, Ingenieurbau und Landschaftsbau, published in 1973.

Contents: General subjects; Water and soil; Field investigations; Subsurface drainage methods; Subsurface drainage efficiency; Hydraulic calculation; Drainage project – technical planning principles; Drainage materials construction of subsurface drainage; Maintenance of drainage. The subject of saline soils has also been treated in view of absolute necessity of drainage for the purpose of irrigation in many developing countries.

Framji, K.K.
State-of-the-art: irrigation drainage and flood control
New Dehli: I.C.I.D., 1978. – no. 1. – 67 p. –
FIBOWA 28/196

Eleven reports cover the following topics: Role of land reclamation in solving the world food problem; Modern trends in mechanization of construction of irrigation and drainage projects; Improvement of irrigation methods; Artificial groundwater recharge; Saline and alkali soils, their use and improvement; Automation in irrigation; Use of precast units in hydraulic structure construction; New solutions in the field of flood control.

Irrigation and drainage in Japan pictorial
Tokyo: Japanese Society of Irrigation, Drainage and Reclamation Engineering, 1978. – 96 p. –
FIBOWA 28/220

A review of Japan's effort to consolidate its agricultural infrastructure, including the land, water, soil and environmental technology needed to accomplish this goal. The various disciplines fall under the heading of 'Nogyo-Doboku' (agricultural civil engineering). This is one of two books intended to show the role of Nogyo-Doboku in Japanese agriculture today, with special emphasis on irrigation and drainage.

Irrigation and drainage in Japan

Tokyo: Japanese Society of Irrigation, Drainage and Reclamation Engineering, 1972 – 111 p. –
FIBOWA 28/149

The first of two books prepared by the Japanese Society of Irrigation, Drainage and Reclamation Engineering to report on the latest developments in that country's agricultural technology. A thorough overview of Japan's Nogyo Doboku (agricultural civil engineering) with a special emphasis on irrigation and drainage techniques. See also the companion volume, Irrigation and drainage in Japan pictorial, published in 1978. Contents: What is Nogyo Doboku?; The territory of Japan; Agricultural activities; Engineering and engineers; Administration system; Projects.

McCready, W.

Drainage construction techniques for vertical tubewell drainage

New Delhi: I.C.I.D. 1978. – 46 p. –
FIBOWA 24/64

In situations of high watertable, the crops may suffer from waterlogging and salinity, subsurface drainage is one of the remedial measures to prevent waterlogging and salinity, achieved by horizontal drainage effected by open or buried drains or vertical drainage by use of wells. Contents: General; Design factors; Construction materials; Construction; Operation and maintenance.

Molen, W.H. van der

Water management (Drainage)

Wageningen: Agricultural University, 1978. – ca. 120 p. – (Edition: not intended for publication; distributed to participants of the M.S. course only).

Books - 1977 -

Duke, H.R.

Capillary flow in agricultural drainage

Corvallis: Oregon State University, 1977. – 99 p. – (Station bulletin. Agricultural Experiment Station. Oregon State University; no. 629).
FIBOWA 24/205

The process of drainage of soil water is customarily treated as a fully saturated flow phenomenon. Recent collaboration between several scientists illustrates that the partially saturated zone can significantly influence the overall performance of agricultural drains, particularly with respect to maintenance of a desirable root environment in shallow or very fine textured soils.

The capillary properties of the pertinent soils are described. The second section details the modelling of a capillary flow system and presents models already used successfully to predict both vertical drainage of the soil profile and horizontal flow associated with a sloping watertable. The final section describes the results of numerical analyses of both sloping aquifers and parallel drain systems. The capillary region is shown to have considerable influence not only upon the predicted watertable position, but also upon the relation between watertable depth and depth to which soil must be adequately aerated to allow root development.

Naarding, W.H.

A review on international experience with trenchless-versus trenching drainage-machines

Utrecht: Cultuurtechnische Dienst, 1977. – 45 p. – (Mededelingen. Cultuurtechnische Dienst; no. 121).
FIBOWA 32/118(121)

A comparison of trenchless and trenching drainage machines. A list of technical data on several subsurface machines is included.



Oosterbaan, R.J.

The theory of tile and ditch drainage for farmland in a nutshell

Wageningen: I.L.R.I., 1977. – 100 p. – (Lecture notes. International course in hydraulic and environmental engineering).
FIBOWA 24/194

Contents: Soil moisture retention and transport; The Law of Darcy; Steady state groundwater flow between confining layers; The Dupuit assumptions; Steady state unconfined horizontal groundwater flow between confining layers; The Dupuit assumptions; Steady state unconfined horizontal groundwater flow to ditches and wells; Steady state curved groundwater flow to drains; Unsteady state groundwater flow to drains; Steady state flow through ditches and pipes; Determination of hydraulic conductivity; Surveys and investigations for drainage projects; Type and layout of tile and ditch drainage systems; Design and construction of tile and ditch drains; Maintenance of tile and ditch drainage systems; Effects of a tile and ditch drainage system; Defining drainage criteria; The water and salt balance; The uses of steady state equations for the design of subsurface drainage systems with first order criteria; The use of steady state equations, given second order criteria.

Sivanappan, R.K. and K.R. Karai
Irrigation and drainage

Madras: Popular Book Depot, 1977. – 308 p. –

Water management for irrigation and drainage: proceedings of the A.S.C.E. Irrigation and Drainage Division specialty conference, July 20–22, 1977 Reno, Nevada

New York: A.S.C.E., 1977. – 2 vol. –
FIBOWA 28/185(1,2)

Contents: Field design of subsurface drainage systems; Evaluation and Maintenance of Drainage systems; Water management for irrigation and drainage.

Books - 1976 -

Bellin, K., H.J. Collins, and K. Gallwitz
Entwicklungen in der Dräntechnik in der Bundesrepublik Deutschland, 1950-1975. (Developments in drainage engineering in the German Federal Republic)

Hamburg: Parey, 1976. - 186 p. - (Schriftenreihe des Kuratoriums für Wasser und Kulturbauwesen; Heft 24).
FIBOWA 28/34(24)

Half of volume 24 of the series **Schriftenreihe des Kuratoriums für Wasser und Kulturbauwesen**. An overview of the evolution of drainage technology and materials in West Germany, 1950-1975. Describes design changes that have occurred in drainage pipes, filter material, and drainage machines. Examines developments in pipe-laying techniques, with special emphasis on determining the correct drain depth.

Briechte, D.

Die Dränung von Grundwasserböden (Drainage of soils with a high watertable)

Hamburg: Parey, 1976. - 97 p. - (Schriftenreihe des Kuratoriums für Wasser und Kulturbauwesen; Heft 24).
FIBOWA 28/34(24)

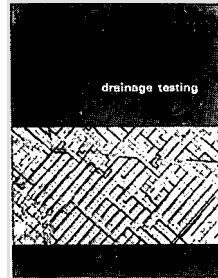
Half of volume 24 of the series **Schriftenreihe des Kuratoriums für Wasser und Kulturbauwesen**. Contents: Goals and tasks of drainage research; Regulating water management in waterlogged soils; Drainage principles and water management - Modelling groundwater movement; Significance and influence of drainage principles and their practical application; Experiments in crop yields.

Dieleman, P.J. and B.D. Trafford

Drainage testing

Rome: F.A.O., 1976. - 172 p. - (FAO Irrigation and Drainage Paper; no. 28).
FIBOWA 32/230(28)

Explicit guidelines on how to test the functioning and adequacy of single drain lines and drainage systems. Notes on drain envelopes, sand and gravel filters, and flow equations used in testing are included.



Proceedings of the Drainage Engineers Conference, 1976

Guelph: University of Guelph, 1976. - 91 p. - (Engineering Technical Publication. School of Engineering. University of Guelph; no. 126-35).
FIBOWA 24/189(35)

Contents: Progress report on land drainage in Ontario; Flood plain policies and administration; Drainage and irrigation in China; Optimization design parameters for small flood-control structures; Maintaining channels for drainage; Can engineers and biologists co-operate in land drainage? Stabilization of drainage channels.

Third national drainage symposium proceedings

St. Joseph: A.S.A.E., (1976). – 148 p. – (Publication. American Society of Agricultural Engineers; no. 1-77). FIBOWA 24/186(3)

Consists of papers on general drainage, evaluation of drainage envelopes, models for drainage design and evaluation, new materials and installation methods for drain tubes, drainage for salinity and water quality control, physical properties of soils related to drainage, and drainage requirements for crop growth. The first National Drainage Symposium was held in 1971; the second in 1972.

Socio-economic aspects of irrigation, drainage and flood control in the Afro-Asian countries: transactions of the ICID first regional Afro-Asian conference

Moscow: Central Bureau of Scientific and Technical Information 1976. – 560 p. – (Publication. USSR National Committee on Irrigation and Drainage). FIBOWA 28/161

Papers presented by Soviet specialists, and experts from ICID member countries Asia and Africa. Specific problems include rainfall and irrigation in Iraq, flood control in Central Asia, and agricultural development of deserts.

Books - 1975 -

Agricultural engineering activities in Japan

Tokyo: Japan International Cooperation Agency, 1975. – 160 p. – (Publication, Irrigation and Drainage Course. Uchihara International Agricultural Training Centre; no. 32). FIBOWA 28/166(11)

An historical overview of Japanese agricultural engineering, including a section on drainage. This book is one of a considerable number prepared by the Irrigation and Drainage Course of the Uchihara International Agricultural Training Centre, Ibaraki Prefecture. The Course's books, all dealing with a wide variety of subjects related to irrigation and drainage, are mainly concise articles by leading Japanese experts. For example, a 3 volume set on field irrigation in Japan and abroad, and a treatise on land consolidation.

Christiansen, J.E., and C.J. Grassi

Manual de drenaje en tierras de riego (Drainage manual for irrigated lands)

Merida: Departamento de Desarrollo Regional de la Organizacion de Estados Americanos (OAS), 1975. – 150 p. – (Publication. Centro Interamericano de Desarrollo Integral de Aguas y Tierras – CIDIAT) FIBOWA 24/198

Contents: Agricultural drainage; Purpose of the Drainage Manual; Drainage in wet zones; Drainage in arid zones; Irrigation efficiency; Requirements for agriculture under perennial irrigation; Examples of typical drainage problems in Latin America; In Argentina; In Peru; In Venezuela; causes of waterlogging and salinity in irrigated areas.

Grassi, C.J.

Manual de drenaje agricola (Agricultural drainage manual)

Merida: Centro Interamericano de Desarrollo Integral de Aguas y Tierras (CI-DIAT), 1975. – 197 p. – (Publication CI-DIAT)

FIBOWA 24/199

Contents: Introduction; Drainage and its relation to the soil and crops; Movement of water through the soil; Sources of excess water; Drainage studies and research surveys; Studies of phreatic and piezometric levels; Permeability studies; Diagnosis of drainage problems; Flow of water towards the drain; Drainage methods; some construction aspects of drainage systems.

Mohn, F.M.

Frasketten- und grabenlos arbeitende Dränmaschinen: ein Vergleich bezüglich ihrer Wirtschaftlichkeit und ihrer Wirkung auf den Boden (Trenching and trenchless drainage machines: a comparison of their profitability and their effect on the soil)

Giessen: Justus-Liebig-Universität, 1975. – 100 p. – (Ph.D. Dissertation).
LH NN 5065, 1975–34.

Proceedings of the drainage engineers conference, 1975

Guelph: University of Guelph, 1975. – 91 p. – (Engineering technical publication. School of Engineering. University of Guelph; no. 126–32).
FIBOWA 24/189

Contents: Benefit cost statements; Environmental impact appraisal for drainage; Design of stable open channels; Aerial photography in land drainage; Does drainage add to flood peaks p; Design of Rip-Rapprotection; Progress report on land drainage in Ontario; Land drainage in England and Wales.

Books - 1974 -

Demian, T.F.

Untersuchungen an einfachen Bodenschneidwerkzeugen insbesondere für grabenlos arbeitende Dränmaschinen ausgeführt an einfachen Modellen (Study on simple ploughshares especially for trenchless drainage machines by means of simple models)

Gottingen: Georg-August-Universität, 1974. – 228 p. – (Dissertation).
LH NN 2460, 1974–28.

Dijkstra, J.A.

Funktionsprüfung verschiedenen Feldentwässerungsvarianten in einem Marschboden (Field-tests of field drainage layouts in clay soils with a high watertable).

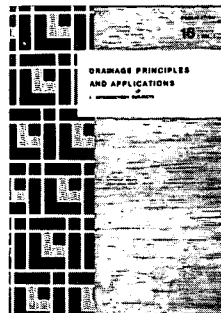
Kiel: Christian-Albrechts-Universität, 1974. – 145 p. – (Dissertation).
LH NN 792, 1974–3.

Drainage principles and applications

Wageningen: I.L.R.I., 1972–1974. – 4 vol. – (publication. International Institute for Land Reclamation and Improvement; no. 16)
FIBOWA 32/109(16-I, -II, -III, -IV)

This four volume series on Drainage Principles and Applications is based on lectures delivered at the International Course on Land Drainage, which is organized annually by the International Institute for Land Reclamation and Improvement, Wageningen, The Netherlands.

Contents:



Volume I: introduction subjects. Contents: Hydrogeology of different types of plains; Soils and soil properties; Salty soils; Plant growth in relation to drainage; Physics of soil moisture; Elementary groundwater hydraulics; Electrical models: conductive sheet analogues;

Volume II: theories of field drainage and watershed runoff. Contents: Subsurface flow into drains; Salt balance and leaching requirement; Effects on irrigation on drainage; Field drainage criteria; Flow to wells; Seepage; Drainage by means of pumping from wells; Rainfall-runoff relations and computational models; Hydrograph analysis for areas with mainly groundwater runoff;

Volume III: surveys and investigations. Contents: Surveys and their sequence; Analyzing rainfall data; Determining evapotranspiration; Hydropedological survey; Groundwater survey; Assessing groundwater balances; measuring soil moisture; Determining hydraulic conductivity of soils; Deriving aquifer characteristics from pumping tests. Deriving soil and hydrological constants from field drainage tests;

Volume IV: design and management of drainage systems: Contents: Subsurface field drainage systems; Surface field drainage systems; Main drainage systems; chemical control of aquatic weeds; Mechanical maintenance of ditches; Drainage of newly reclaimed marine clayey sediments, peat soils, and acid-sulphate soils; Drainage of heavy clay soils; Drainage of rice fields; Procedures in drainage surveys; Management of drainage projects; Economic evaluation of water management projects.

Schilfgaard, J. van, editor.

Drainage for agriculture

Madison: American Society of Agronomy, 1974. – 700 p. – (Agronomy. American society of Agronomy; no. 17).
FIBOWA 32/289(17)

Contents: Drainage and crop production; Current drainage practices; Materials and methods; Saturated flow theory and its application; Unsaturated flow theory and its application; Salts and water movement; Quality of drainage water; Models and analogues for the study of groundwater flow; Determining soil properties; Water management systems.

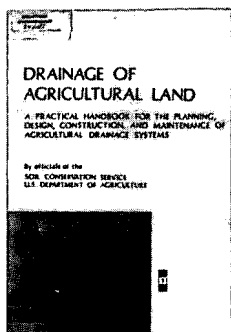
Books - 1973 -

Drainage of agricultural land: a practical handbook for the planning, design, construction, and maintenance of agriculture drainage systems

Port Washington: Water Information Center, 1973. - 430 p. -
FIBOWA 24/187

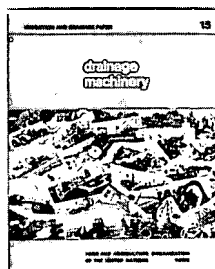
The text of **drainage of agricultural land** is a faithful reproduction of Section 16 - Drainage of Agricultural Land of the National Engineering Handbook, issued in 1971 by the Soil Conservation Service, U.S. Department of Agriculture. The only changes by the publisher are the correction of a few minor typographical errors, the renumbering of pages, the modification of type faces on selected pages, and the addition of an index.

Contents: Principles of drainage; Drainage investigations; Surface drainage; Subsurface drainage; Open ditches for drainage - design, construction and maintenance; Dikes; Drainage pumping; Drainage of organic material; Drainage of tidal lands



Drainage machinery: a report of the Working Party on Water Resources and Irrigation of the European Commission on Agriculture, Bucharest, Romania, 1972
Rome: FAO, 1973. - 122 p. - (FAO. Irrigation and Drainage paper no. 15).
FIBOWA 32/230(15)

Contents: Techniques and costs of underdrainage; Survey of drainage techniques in Belgium; Economics of the use of underdrainage machinery in France; Study on capital and working costs of underdrainage machinery; Techniques and costs of underdrainage in The Netherlands; Mechanized drainage operations in Poland; Capital and working costs of underdrainage machinery.

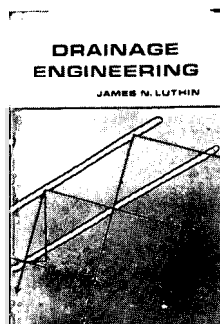


Luthin, J.N.

Drainage engineering

Huntington: Kruger, 1973. - 250 p. -

Contents: Hydraulics and the measurement of water; Rainfall and runoff; Soils; Determining nature and extent of a subsurface drainage problem; Statics of soil water; Dynamics of soil water; Fundamentals of seepage analysis; Measurement of soil permeability; Depth and spacing of drains; Subsurface drains; Open ditch drains for controlling the water table; Drainage wells; Surface drainage and tidal reclamation.



Books - 1972 -

Ayars, J.E.
Drainage of irrigated lands in Grand Valley
Fort Collins: Colorado State University, 1972. (M.Sc. thesis)

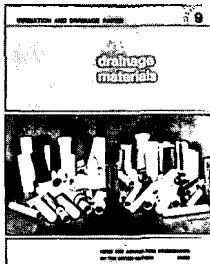
Broughton, R.S.
The performance of subsurface drainage systems on two St. Lawrence lowland soils
Montreal: McGill University, 1972. (Ph.D.)

Veldboek voor land- en waterdeskundigen (Fieldbook for land and water management experts)
Wageningen: I.L.R.I., 1972
FIBOWA 28/61

A compilation of selected nomographs, graphs, and formulas. Prepared by the Delta Study Group, a body of experts from various Dutch technical institutions, specializing in soil science, land and water management, hydrology, agriculture, meteorology, and hydraulic engineering.

Drainage materials: a report of the Working Party on Water Resources and Irrigation of the European Commission on Agriculture, Tel Aviv, Israel, 1970
Rome: F.A.O., 1972 - 122 p. - (FAO. Irrigation and drainage paper; no.9).
FIBOWA 32/230(9)

Surveys of field experiences with various drainage materials in The Netherlands, Belgium, France, West Germany, Hungary, and the United Kingdom. Includes extensive reviews of available specifications.

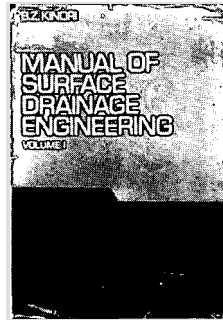


Duke, H.R.
Drainage design, based on aeration
Fort Collins: Colorado State University, 1972. (Ph.D. dissertation).

Books - 1970 -

Kinori, B.Z.
Manual of surface drainage engineering
Amsterdam: Elsevier, 1970. -224 p. -
FIBOWA 24/109(I)

A manual for the practical engineer. Brings together the wide variety of knowledge on surface drainage through brief theoretical explanations. Includes equations, graphs, and nomographs, all accompanied by instructions and sample problems with solutions.



Muth, W.
Dränung mit Dränrohren aus Ton (Drainage with clay pipes)
Stuttgart: Fachverband Ziegelindustrie Baden-Württemberg, 1970. - 100 p. -
FIBOWA 24/180

Contents: Soil; Soil-water relation; Growth conditions; Design and layout; Clay pipes; Construction and maintenance; Quality control.

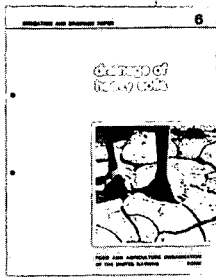
Mann, G.
Untersuchungen über den Einfluss der Eintrittsöffnungen und des Verfüllbodens auf die Dränfunktion (Study on the effects of pipe openings and refill on drainage performance).
Kiel: Christian-Albrechts Universität, 1970. - 243 p. - (Ph.D. dissertation).
FIBOWA 24/166

Books - 1971 -

Drainage of heavy soils: report of the Working Party on Water Resources and Agriculture of the European Commission on Agriculture, Tel Aviv, 1970

Rome: F.A.O., 1971 - 109 p. - (FAO, Irrigation and Drainage paper; no.6)
FIBOWA 32/230(6)

Experts from several european countries deal with the drainage of heavy soils using various methods under various conditions.



Hedstrom, W.E., A.T. Gorey, and H.R. Duke

Models for subsurface drainage

Fort Collins: Colorado State University, 1971. - 56 p. -
(Hydrology Paper. Colorado State University; no. 48).

Reclamation of salt-affected soils

Narayana, V.V.D.

Reclaiming alkali soils: engineering aspects

Karnal: Central Soil Salinity Research Institute, 1980. – 61 p. – (ICAR bulletin; no. 6)
FIBOWA 32/320(6)

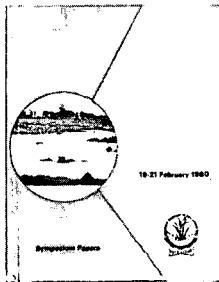
Contents: General; Basic data; Subsurface drainage; Surface drainage; Water management; Hydrologic evaluation

Bedi, K.S.

International symposium on salt affected soils, 18 to 21 February 1980

Karnal: C.S.S.R.I., 1980. – 569 p. –
FIBOWA 17/864

Seventy-six papers presented on a wide variety of subjects related to saline soils. Contents: Characteristics; Genesis and classification; Diagnostic criteria and methodology; Physical properties; Salt movement; Leaching; Amendments and reclamation; Water quality and crop response to salinity; Nutrient relations; Physiological aspects; Genetics and plant breeding; Technology.

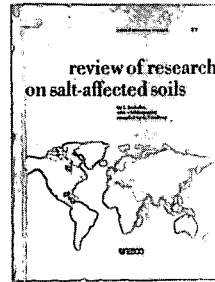


Szabolcs, I

Review of research on salt-affected soils

Paris: UNESCO, 1979. – 137 p. – (Natural resources research; no. 15).
FIBOWA 32/153(XV)

Contents: Definition grouping, extent and mapping of salt-affected soils; Effects of salts on soil and soil properties; Role of environmental conditions in the formation of salt-affected soils; Effect of water-soluble salts on saline and alkali soils; Potentially salt-affected soils; Main aspects of improvement, reclamation and agricultural utilization of salt-affected soils.



Martinez Beltran, J.

Drainage and reclamation of salt-affected soils in the Bardenas area, Spain

Wageningen: I.L.R.I., 1978. – 322 p. – (Ph.D. dissertation) – (Publication. International Institute for Land Reclamation and Improvement; no. 24).
FIBOWA 32/109(24)

On the basis of drainage experiments, a drainage system for saline soils with low infiltration rate is recommended. Contents: General characteristics of the area; Hydrology; Soils and soil conditions; Soil salinity; Drainage and reclamation experimental fields; Experimental field design; Derivation of agro-hydrological factors; Desalinization process; Subsurface drainage system.

Dieleman, P.J.

Reclamation of salt-affected soils in Iraq: soil hydrological and agricultural studies

= **Mise en valeur des sols salés en Irak**
= **Urbarmachung versalzter boden** =
Rescate de terrenos salinos en Irak, 3rd edition

Wageningen: I.L.R.I., 1977. – 175 p. – (Publication. International Institute for Land Reclamation and Improvement; no. 11)
FIBOWA 32/109(11)

A report on the results of work on experimental fields in central and southern Iraq. The object is broadly defined as the acquisition of more basic knowledge on the reclamation of saline soils with regard to soil condition, drainage and irrigation, and cultivation practices.

Alva, C.A., J.G. van Alphen, A. de la Torre

Problemas de drenaje y salinidad en la Costa Peruana (Drainage and salinity problems in the Peruvian coastal zone)

Wageningen: I.L.R.I. 1976. – 116 p. – (Bulletin. International Institute for Land Reclamation and Improvement; no. 16).

FIBOWA 32/109(16)

Two main sections discuss drainage and salinity problems, and reclamation of saline and sodic soils in the coastal zone of Peru.

Reclamation of saline and alkali soils 1974–1966 a supplement to no. 1056; 1966–1962

Harpندن: C.A.B., 1975. – 43 p. – (Annotated Bibliography. Commonwealth Bureau of Soils; no. 1713).
FIBOWA B371

Aboukhaled, A., A. Arar, and A.M. Balba

Research of crop water use, salt affected soils and drainage in the Arab Republic of Egypt: a review with recommendations

Cairo: F.A.O., 1975. – 92 p. –
FIBOWA 28/156

Contents: General recommendations; Crop water use by P.E. Rijtema and A. Aboukhaled; Salt affected soils by A.M. Balba. L.T. Kadry and A. Taher; Drainage by A. Arar and B.G. Bishay.

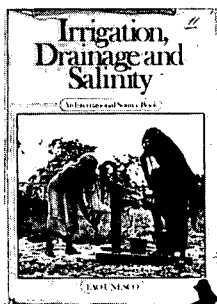
Skogerboe, G.V., W.R. Walker, and R.S. Bennett

Evaluation of drainage for salinity control in Grand Valley

Washington: U.S. Environmental Protection Agency, 1974. – 100 p. – (Environmental protection technology series. U.S. Environmental Protection Agency: No. EPA-660/2-74-084)
FIBOWA 32/259(74-084)

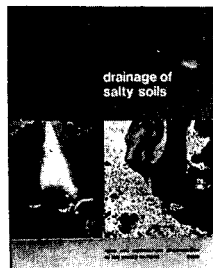
Kovda, V.A., C. van den Berg, and R.M. Hagan, editors
Irrigation, Drainage and Salinity: and international source book
London: Hutchinson, 1973. – 510 p. – FIBOWA 28/70a

Water and salt balances; Soils in relation to salinity, irrigation and drainage; Chemistry of saline and alkali soils of arid zones; Landscapes in relation to irrigation, drainage and salinity; Plants in relation to waterlogging and salinity; Drainage systems and management; Some effects of irrigation and drainage on soils; Reclamation of saline and alkaline; Design and operational recommendations for the establishment or improvement of irrigation and drainage projects.



Drainage of salty soil: Working party on Water Resources and Irrigation of the European Commission on Agriculture, Bucharest, 1972
Rome: F.A.O., 1973. – 84 p. – (F.A.O. Irrigation and Drainage paper; no.16). FIBOWA 32/230/16

Papers presented on the general aspects of drainage of salty soils, and on pilot projects in Romania, Spain, and Turkey.



Salinity seminar Baghdad: report of regional seminar on methods of amelioration of saline and waterlogged soils, Baghdad, Iraq, 5-14, December 1970
Rome: F.A.O., 1971. – 254 p. – (F.A.O. Irrigation and drainage paper; no.7). FIBOWA 32/230(7)

A seminar of senior government officials and high level experts to review and discuss the scientific, technical and organizational aspects of 1) reclaiming or improving salt affected and waterlogged soils, 2) conserving productive lands, and 3) using saline water for irrigation.

Richards, L.A.

Diagnosis and improvement of saline and alkali soils

Washington D.C.: U.S.D.A., 1954. – 160 p. – (Agriculture Handbook. U.S.D.A.; no. 60)

FIBOWA 19/12

A handbook intended primarily as a practical guide for those who are confronted with soil, plant and water problems involving salinity and alkali. Contents: Origin and nature of saline and alkali soils. Sources of soluble salts; Determination of the properties of saline and alkali soils; Improvement and management of soils in arid and semi-arid regions in relation to salinity and alkali; Plant response and crop selection for saline and alkali soils; Quality of irrigation water; Methods for soil characterization; Methods of plant culture and plant analysis; Methods of analysis of irrigation waters.

