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AQUASTAT Survey – 2011

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Foreword

With the rapid economic transformations occurring in Southern and Eastern Asia region, the need for reliable and systematic information on water, its quality and its use has never been greater.

The region represents 15 percent of the global land mass, but houses over half of the world population. While large parts of the region are well endowed with water, the renewable water resources per person in the region are less than half the renewable water resources per persons at a global level. This is an indicator not just of high population growth, it is also a reflection of the intensity of water use across rapidly growing economic sectors – not just agriculture.

Over 60 percent of the global irrigation area is located in this region and more than 80 percent of water withdrawals are used for irrigation, with much of this withdrawal occurring across transboundary river basins. Therefore the joint management of water resources is becoming an imperative and this requires water information to be available and comparable.

In order to understand fully the state, trends and challenges facing water management for agriculture, FAO initiated the AQUASTAT Programme in 1993 to serve as its global information system on water and agriculture. AQUASTAT collects, analyses and disseminates data and information by country to provide users with the most accurate, reliable, consistent and up-to-date information available on water resources and agricultural water management.

This AQUASTAT report presents the most recent information available on water resources and their use in the 22 countries in the Southern and Eastern Asia region. Clearly it has an emphasis on agricultural water use and management. But in addition it contains the relevant tables and maps, and a regional synopsis emphasizing the particular characteristics of this large and diverse region. It also analyses the changes that have occurred since the first survey in 1999. Finally it gives a more detailed description of four transboundary river basins in the region, highlighting the different levels of cooperation and the agreements between countries located in the same river basin: the Ganges–Brahmaputra–Meghna basin, the Indus basin, the Mekong basin and the Salween basin.

We hope that this publication will contribute to a better understanding of irrigation conditions in the Southern and Eastern Asia region and to well-informed decision-making in the field of water management as a whole.

Alexander Müller
Assistant Director-General
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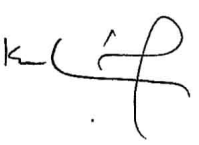
and Environment Department



Parviz Koohafkan
Director
Land and Water Division

Units

Lenght

1 km = 1 000 m = 1 x 10^3 m

1 mile = 1.56 km = 1 560 m

1 foot = 30.48 cm = 0.3048 m

1 inch = 2.54 cm = 0.0254 m

Area

1 acre = 4 047 km^2 = 0.4047 ha = 4.047 x 10^{-4} x 1 000 ha

1 are = 100 m^2 = 0.01 ha = 1 x 10^{-5} x 1 000 ha

1 feddan = 4 200 m^2 = 0.42 ha = 4.2 x 10^{-4} x 1 000 ha

1 ha = 0.01 km^2 = 10 000 m^2 = 2.47 acres = 2.38 feddan

1 km^2 = 1 000 000 m^2 = 100 ha = 1 x 10^{-1} x 1 000 ha

1 m^2 = 0.0001 ha = 1 x 10^{-7} x 1 000 ha

Volume

1 dm^3 = 1 litre = 0.001 m^3 = 1 x 10^{-12} km^3

1 hm^3 = 1 million m^3 = 1 000 000 m^3 = 1 x 10^{-3} km^3

1 km^3 = 1 billion m^3 = 1 000 million m^3 = 10^9 m^3 = 10^9 m^3

1 m^3 = 10^{-9} km^3

1 UK gallon = 4.546 litres = 4.546 dm^3 = 0.004546 m^3 = 4.546 x 10^{-12} km^3

1 US gallon = 3.785 litres = 3.785 dm^3 = 0.003785 m^3 = 3.785 x 10^{-12} km^3

Power-energy

1 GW = 1 x 10^3 MW = 1 x 10^6 kW = 1 x 10^9 W

1 GWh = 1 x 10^3 MWh = 1 x 10^6 kMh

1 acre-foot = 1 233.48 m^3

US$1 = 1 United States dollar

1 °C = 1 degree centigrade

The information presented in this publication is collected from a variety of sources. It reflects FAO's best estimates, based on the most accurate and up-to-date information available at the date of printing.

List of abbreviations

ADB	Asian Development Bank
ARC	American Red Cross
AWDI	Alternative wet and dry irrigation
BCE	Before Common Era
BOD	Biochemical oxygen demand
CA	Conservation agriculture
CIA	Central Intelligence Agency
COD	Chemical oxygen demand
DO	Dissolved oxygen
DTW	Deep tube wells
EPA	Environmental Protection Agency
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
FAO	Food and Agriculture Organization of the United Nations
FAP	Flood action plan
FCD	Flood control and drainage
FCDI	Flood control, drainage and irrigation
FLIA	Farm land improvement associations
FMTW	Force-mode tubewell
FWUC	Farmer water user communities
GBH	Gravel bed hydroponics
GDD	Growing degree days
GDP	Gross domestic product
GIS	Geographical information systems
HYV	High-yielding variety
IBRD	International Bank for Reconstruction and Development
IA	Irrigators' association
ICARDA	International Center for Agricultural Research in the Dry Areas
ICID	International Commission on Irrigation and Drainage
IDA	International Development Association
IEC	Information education and communication
IFAD	International Fund for Agricultural Development
IAEA	International Atomic Energy Agency
IRBM	Integrated river basin management

IRC	International Water and Sanitation Centre
IRSWR	Internal renewable surface water resources
IRWR	Internal renewable water resources
ISEAS	Institute of Southeast Asian Studies
ISRWR	Internal renewable surface water resources
IWASRI	International Waterlogging and Salinity Research Institute
IWM	Improved irrigation water management
IWMI	International Water Management Institute
JBIC	Japan Bank for International Cooperation
JCWR	Nepal-India Joint Committee on Water Resources
JICA	Japan International Cooperation Agency
LGU	Local government unit
LLP	Low lift pump
MDG	Millennium Development Goals
MOP	Manually operated pumps
MPO	Master Plan Organization
MRC	Mekong River Commission
MSF	Multi-stage flash
MV	Modern variety (seeds)
NGO	Non-governmental organization
O&M	Operation and maintenance
OECD	Organisation for Economic Co-operation and Development
OFWM	On-farm water management
OPEC	Organization for the Petroleum Exporting Countries
PARC	Pakistan Agricultural Research Council
PDR	People's Democratic Republic (Lao)
PIMD	Participatory Irrigation Management and Development
RAP	Regional Office for Asia and the Pacific (FAO)
R&D	Research and development
RO	Reverse osmosis
RSC	Residual sodium carbonate
SAR	Sodium adsorption ratio
SCARP	Salinity Control and Reclamation Project
SIDA	Swedish International Development Agency
SME	Small and medium enterprises
SMO	SCARP monitoring organization
SMP	Strategic management plan

SOF	Securing Our Future (The Asia Foundation)
SOPAC	Scripps Orbit and Permanent Array Centre
SRI	System of rice intensification
SSWRD	Small-scale water resources development
STW	Shallow tube wells
SWIM	Small water impounding management
TA	Technical assistance
TDS	Total dissolved solids
TRWR	Total renewable water resources
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
USDA	United States Department of Agriculture
USSR	Union of Soviet Socialist Republics
VDSSTW	Very deep-set shallow tubewell
WEPA	Water Environment Partnership in Asia
WFP	World Food Programme
WHO	World Health Organization
WM	Water management
WSI	Water-saving irrigation
WUA	Water user association
WUG	Water user group
WWF	World Wildlife Fund

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