

INTERNATIONAL COMMISSION ON IRRIGATION AND DRAINAGE



**BEIJING
2005**



ICID•CIID

19th International Congress on Irrigation and Drainage

**USE OF WATER AND LAND FOR FOOD AND
ENVIRONMENTAL SUSTAINABILITY**

**10-18 September, 2005
Beijing, China**

CALL FOR PAPERS



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International Commission on Irrigation and Drainage

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DATES TO REMEMBER

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| 1. Submission of Summary and Conclusions | 01 September 2004 |
| 2. Intimation of Acceptance | 15 December 2004 |
| 3. Receipt of full text of accepted papers | 01 March 2005 |

INVITATION

The International Commission on Irrigation and Drainage (ICID) is a scientific and technical non-governmental international professional organization dedicated inter alia, to improve water and land management to enhance the worldwide supply of water and fibre for all people.

ICID stimulates and promotes the development and application of arts, sciences and techniques of engineering, agriculture, economics, ecology and social sciences in managing water and land resources for irrigation, drainage and flood control and river training applications. Its objects encompass research and development, capacity building, and adoption of comprehensive approaches and up-to-date techniques for sustainable agriculture in the World. ICID, founded in 1950, has 104 member countries spread across all the continents.



ICID holds its Congress on themes of global interest every three years in one of its member countries. The 19th Congress of ICID will accordingly be organized in Beijing, China, from 11-19 September 2005. The theme of the Beijing Congress is “**Use of Water and Land for Food and Environmental Sustainability**”. The theme and the detailed scope of the topics under the theme comprising two basic Questions, Special Session and the Symposium were approved by the International Executive Council of ICID, at its 53rd meeting held in Montreal, Canada in July 2002.

The ICID Congresses focus on the recent accomplishments as well as the upcoming issues to be addressed in irrigation and drainage. The purpose of the Congress is to study recent developments and to present new expectations from such developments, especially in light of continuous growth of world population and the growing environmental concern. The Congresses also provide a platform for reviewing a number of contentious issues which concern the future of irrigation water under increased demands arising due to competitive uses of water.

The general reporters and the panel experts were selected and approved by the ICID Management Board at its meeting held in Montpellier, France in September 2003. The scope of the technical sessions and names of general reporters/panel experts are given in this Call for Papers.

For the preparation of Congress papers, a modified approach is to be followed for submission of papers as also to improve the quality. Only a limited number of papers will be selected for presentation at the Congress and their text will be published on CD-ROM. Poster Sessions for the Congress Questions will also be organized, in order to give opportunity to more authors to make their presentations at the Congress in order to have a closer and intensive interaction with the international participants. Full text of the accepted papers for the Poster Session will also be published on CD-ROM. The transactions will contain all keynote addresses, general reports and abstracts of all papers.

The schedule for submission of papers has been kept as short as possible. The Central Office of ICID is fully geared up to process all papers with its Desk Top Publishing system.

I trust that the setup of the 19th Congress, with the selected topics and their scope, will offer a splendid opportunity to present and discuss new developments and results for sustainability in the field of irrigation, drainage and flood control in an international forum. All potential authors are invited to contribute their valuable papers for the Congress.

A handwritten signature in black ink, appearing to read 'C.D. Thatte'. The signature is stylized and somewhat cursive.

C.D. Thatte
Secretary General, ICID

22 December 2003
New Delhi

WELCOME

At the 51st International Executive Council (IEC) Meeting held in Cape Town, South Africa, in 2000, the Chinese National Committee on Irrigation and Drainage (CNCID) made a proposal to the ICID International Executive Council (IEC) to host the 19th Congress and 56th International Executive Council meeting. At that IEC meeting the proposal was accepted and China was invited to host the 19th Congress and 56th International Executive Council meeting in Beijing, China from 11-19 September, 2005.



China is a vast country rich in natural resources and historical sites. The Chinese civilization is one of the earliest in the world with recorded history of more than 5000 years. China also has a long history in irrigation, drainage and flood control since the water control by Yu, the reputed founder of the Xia Dynasty in 21st-16th century B.C.. The Zhengguo Canal, the Dujiangyan Project, the Lingqu Canal, the Grand Canal, and many other hydroprojects built by ancient Chinese people performed important functions in history with respect to social and economic development. Some of these age-old facilities are still generating benefits to the people nowadays. Many ancient irrigation projects have become part of the cultural heritage of the nation.

Since 1949, over 270,000 kilometers dykes have been built or reinforced and more than 85,000 reservoirs of various sizes have been constructed, bringing normal floods of large rivers under preliminary control. The annual water supply capacity has reached 580 billion cubic meters; the total irrigated area has been increased from 16 million hectares to more than 55.3 million hectares; and 86 million hectares of land exposed to water and soil erosion has been brought under control.

Although enormous achievements have been obtained in the water sector in China, it must be noted that water, food security and environment are still the serious challenges confronted by China and the whole world in the 21st century. Therefore, the theme of ICID 19th congress “**Use of Water and Land for Food and Environmental Sustainability**” provides us an opportunity to discuss these issues and share the experiences among scientists, engineers and environmental workers in Beijing, 2005.

I take pride to invite all members of the ICID family to participate in ICID 19th Congress and 56th IEC meeting in September 2005. Beijing, the capital of China, also has a long history and many tourist sites, such as the Forbidden City, the Great Wall, the Summer Palace and the Temple of Heaven etc. China welcomes all of you with its beautiful tourist sites, rich experience in irrigation and drainage, and warm and satisfactory service. We will make every effort to assure all participants of a successful congress and a pleasant stay in China.

I look forward to seeing all of you in Beijing.

A handwritten signature in black ink, consisting of three Chinese characters: 翟浩辉 (Zhai Haohui). The signature is written in a cursive style.

Zhai Haohui
Vice Minister of the Ministry of Water Resources, China
Chair of the Congress Preparatory Committee

19th International Congress on Irrigation and Drainage

10-18 September, 2005

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SCOPES OF CONGRESS TOPICS

During the Congress, papers are presented and discussed for two Questions, a Special Session, a Special Event, a Symposium, a Seminar, and a Workshop. For the Questions, authors can submit papers through their National ICID Committees, or through the International Organizations active in the field of irrigation and drainage. For the Special Session, Symposium and Seminar, only one paper per country can be submitted. Details are given in this Call for Papers. The topics for the two Questions, Special Session, Symposium and Seminar are:

A. CONGRESS QUESTIONS

Question 52 Improving Water and Land Management for Increasing Efficiency in Irrigated Agriculture

Question 53 Harmonious Coexistence with Flood Water

B. Special Session Legal and Institutional Challenges

C. Symposium Water Quality/Salinity Management

D. Seminar Management of Historical / Traditional Irrigation Projects

CONGRESS THEME : **Use of Water and Land for Food and Environmental Sustainability**

The world population is expected to increase from 6 billion in 2000 to 9 billion in the year 2050, mostly in the developing countries. To meet the food requirements of this growing population, the global food production will have to be doubled.

Food production depends on two fundamental resources: land and water. Their per capita availability is decreasing with the increase in world population. Today, much of the world's arable land, particularly in developing countries, has been brought under cultivation. Further expansions can be expensive or adversely affect the environment. Large tracts of cultivated lands under irrigation are presently affected by waterlogging and soil salinity. Fertile low lands are frequently flooded or constantly submerged under water. These lands will require extensive investments in drainage, irrigation and flood control systems.

Fresh water resources are being stretched to its limits in many developing countries or becoming scarcer and polluted. There is however some potential

to expand the existing land base and water storage capacity for food production. This however means that increased food demand will have to be met largely from the present infrastructure and through a more prudent deployment of our land and water resources.

The key to increasing future food production thus lies in increasing withdrawals where potential exists, better water and land management in existing irrigated areas and increase in water use efficiency and land productivity.

In addition to increasing agricultural production there is a need to minimize losses of agricultural land and crop yields caused by flooding and droughts. Especially in densely populated flood prone areas where flood management urgently needs more attention.

When addressing sustainability issues, there is a need to manage water and land resources more prudently not only in quantity but also in quality, and to reduce agriculture pollutants and restore of water quality by recycling and reuse poor quality waters.

The challenges to professionals working in the field of irrigation, drainage and flood control are enormous. They comprise the ability to design and operate new generation of efficient agricultural water management systems while sustaining ecosystems and the environment.

A. CONGRESS QUESTIONS

QUESTION 52 : Improving Water and Land Management for Increasing Efficiency in Irrigated Agriculture

General Reporter : Prof. Cai Lingen (China)

Panel of Experts : Prof. F. Ligetvari (Hungary)
 Prof. Pulatkhon D. Umarov (Uzbekistan)
 Prof. E.U. Nwa (Nigeria)
 Dr. Albert J. Clemmens (USA)
 Eng. Hussien El-Atfy (Egypt)
 Mr. Robert Ian Bell (Australia)

Management of water and soil is a worldwide priority aimed at better meeting the needs for food, livelihoods and nature in a sustainable manner. Integrated approaches must take into account not only scientific and technical but also the socio-economical and environmental aspects. It is widely agreed that irrigation will play a greater role in meeting future food demands than it has played in the past; however, irrigation must achieve this goal with less water. There is an

urgent need to explore ways to produce more food with less water under sustainable conditions. Contributions are invited in this question under the following sub-topics.

52.1 On-farm water and soil management

Improvement of on-farm irrigation systems; precision land leveling by using LASER leveling equipments and precision irrigation; improved irrigation methods and technology for increasing efficiency of water, land and labor; crop water requirements and on-farm irrigation scheduling techniques, including deficit irrigation, alternate wet and dry irrigation for paddy rice; improved soil management for reduction in runoff and/or evaporation, including sub-soiling, none tillage, mulching and covering; Integrated management water and fertilizer supplies; method to reduce fertilizer depletion.

52.2 Performance evaluation and integrated management of irrigation and drainage systems

Indicators and technologies for performance evaluation; impacts of irrigation and drainage on farmer's income and poverty reduction; impacts of irrigation and drainage on ecosystems and environment; benchmarking of irrigation and drainage systems; socio-economic evaluation of rehabilitation and modernization of irrigation and drainage systems; integrated management of irrigation and drainage systems: innovative approaches and tools; multiple functions of irrigation and drainage systems; improving basin-wide overall efficiency of water usage; evaluation of management effect on environmental sustainability.

52.3 Conjunctive use of water to optimize food production

Dynamic allocation of surface and ground waters and optimum management at system level and basin level; conjunctive use of surface and groundwater: experiences and problems; regional assessment of availability for sustainable irrigation water use; rain water harvesting for irrigation; use of low quality water and drainage water reuse for irrigation; assessment of exploitable groundwater and improvement of recharge; conjunctive use of fresh water and saline and low quality water in irrigation: its impacts on soil productivity, monitoring and modeling.

52. 4 Policy options for water saving in irrigation

Policy options for increasing investment in rehabilitation and modernization of existing irrigation systems; socio-economic incentives for adoption of high efficiency techniques; education and capacity building for irrigation and drainage development; strengthening of training and extension services for dissemination of water efficient technologies; promoting innovative research on irrigation and drainage technologies; encouraging private irrigation industries; degree and extent of governmental involvement in irrigation; large scale irrigation management versus small scale irrigation management; high-level elaborate management versus low-level non-elaborate management.

52. 5 Management transfer and participatory irrigation and drainage management

Socio-economic and physical conditions required for success of irrigation management transfer; economic and institutional options for participatory management based on local conditions; government support and institutional service; constraints, experience and lessons in management transfer and participatory management.

52. 6 Application of information technology in irrigation and drainage management

Geographic information system (GIS) applications; remote sensing (RS) and data acquisition systems; decision support system (DSS); expert systems and decision-making models; information systems and web technologies; automatic control systems; high-level expensive devices versus low-level inexpensive ones in automatic control systems.

QUESTION 53 : Harmonious Coexistence with Flood Water

General Reporter : Prof. dr. Bart Schultz (The Netherlands)

Panel of Experts : Mr. Peter Frank Borrows (UK)
 Prof. André Musy (Switzerland)
 Mr. Jacky Astier (France)
 Mr. Illahi B. Sheikh (Pakistan)
 Mr. S.K. Agarwal (India)
 Dr. Takeshi Hata (Japan)

Water issues manifest themselves in different forms depending on natural conditions and social dynamics. Some regions of world suffer from chronic water shortages, while others from frequent floods.

Statistical studies indicate that almost one-third of world's population have been affected by natural disasters in the last decade of the 20th century. Floods and droughts accounted for 86% of them.

Increasing population has led to the settlement and cultivation of flood plains resulting in increased emphasis on flood management in many regions; particularly in South and East Asia, which has by far the most densely populated regions of the world. These two regions hold at present about 2.9 billion people, almost half of the world's population. It is expected that by 2025 the population in these regions will increase to about 4.3 billion and within 50 years 80% of the population will live in flood prone areas.

In addition to heavy rainfall and floods during the monsoon season, huge man-induced changes such as uncontrolled land reclamation and inadequate land use planning, may increase the vulnerability of the flood prone areas. Structural and non-structural measures and development of integrated flood management and flood protection measures are needed for effective flood protection. These must be applied in a way that take into account the existence of viable river systems and in harmony with floodwaters. Contributions are invited under this question the following sub-topics.

53.1 Land use planning and its impact on flood and drought regime

Effects of climate change on flood and drought regime and its integration into land and water use planning; technologies for integrated land and water use planning including the forecast of land use changes and assessment of land use impacts; hydrological processes affected by land use and agricultural practices; risk assessment in land use planning, coping with floods and droughts; environmental improvement in rainfed agriculture: soil and water conservation; adjusting land use to soil and water conservation; flood and drought disaster and food security; wetland recovery and water environment protection; evaluation of effect of flood water detention capacity of farm land; use of vegetation to reduce flood damage.

53.2 Integrated planning and management of flood diversion, storage, retention and discharge areas

Flood characteristics in watersheds and river basins; integrated planning of irrigation, drainage and flood control systems and decision-making procedures for new dams; historic flooding events, analysis of effects and damages and desired level of protection; inspection and management of dykes regularly and in emergencies;

management and rules for use of flood diversion, retention and discharge areas; integrated operation and risk management of flood diversion, storage and retention areas; resettlement strategies and policies in water project areas; non-structural measures to prevent floods; groundwater recharge using flood water; evaluation of actual effects of dams in reducing floods and increasing available water.

53.3 Adjusting urban and rural development to reduce flood risks

Risk analysis and risk management related to flood protection of densely populated areas; integrated planning of urban and rural development in harmony with flood management; flood plain zoning and alternative development options for urban and rural development; regional economic development and policies for flood insurance; resettlement from areas with high flooding risk

53.4 Mechanisms for protection, relief and rehabilitation

Mechanisms for investment in flood protection works and assessment of benefits; operation, maintenance and management of flood protection works: institutional and financing aspects; evaluation of damage to infrastructure, crops, irrigation, drainage and flood control systems, public and private property by survey, modeling and remote sensing; relief: organizational and financing aspects; rehabilitation of damaged irrigation, drainage and flood control systems.

53.5 Information technical systems and professional contingent for flood fighting

Improved flood forecast and warning systems; mathematical models for simulation of floods real-time monitoring technology of flooding; application of GIS in Decision Support System for flood control; application of RS for flood damage monitoring and assessment; Decision Support System for emergency decision making digital river basin technology and modernization of river basin management organization and professional contingency for flood fighting.

53.6 Case studies

B. SPECIAL SESSION : Legal and Institutional Challenges

General Reporter : Mr. H. Tardieu (France)

Panel of Experts : Dr. Ding Kunlun (China)
 Mr. S.A. Assadollahi (Iran)
 Ir. Mohd. Azhari bin Ghazalli (Malaysia)
 Dr. Mark Svendsen (USA)
 Mr. Shuhei Seyama (Japan)
 Mr. S.V. Sodal (India)

Traditionally, the planning, development, withdrawal, uses and disposal of water have mostly rested with governments particularly in developing world. However, public intervention in irrigation and drainage has been often unsustainable and inefficient. Financial allocation for water development or operation and maintenance of existing irrigation systems has steadily declined with many existing water systems in danger of being unable to supply water. Low water prices and inappropriate management is also a cause of low water use efficiency and waterlogging and soil salinity. Moreover, intersectoral and regional competition for water are factors of major concern.

The Special Session will provide a forum where these and other relevant issues and experiences illustrated by case studies can be discussed. Authors are invited to submit papers on the following topics.

- Institutional and legal issues in groundwater utilization;
- Institutional and legal frameworks for intensive job creation in water resources management projects;
- Mechanisms for equity in water distribution and conflict resolution;
- Institutional reforms in the irrigation sector;
- Water rights, water pricing and water markets;
- Institutional and legal aspects for management transfer and participatory irrigation and drainage management;
- Comprehensive water policies and institutional arrangement for reform implementation;
- Comprehensive water codes for sector legislation: Irrigation acts, drainage acts, etc;
- Legal steps to ensure environmental sustainability of irrigation and drainage;
- Legal aspects of conflict resolution in construction of irrigation and drainage facilities including dams.

C. SYMPOSIUM : Water Quality/Salinity Management

Water quality and salinity have become issues of great concern worldwide. Pollution of surface waters and pollution of groundwater from land use and poorly

managed agriculture are widespread worldwide. In fact, the amount of polluted return flows has tripled since 1950.

Wastewater from agricultural practices is often cleaner than domestic and industrial wastewater. Scarcity of freshwater resources will necessitate the reuse of drainage water for irrigation. Similarly, effluents from industrial and municipal sources will be reused for irrigation. The use of contaminated water carries certain risks to human health the flora and fauna. Managing water quality to prevent these conditions requires careful assessment and monitoring of inflows and effluent waters. At the same time, recycling and reuse systems should take into account the cumulative effects of pollutants over time as well as the impacts on the soil and water environment. All in all, awareness of these environmental, technological and practical issues is needed at all times for the benefits of planners, managers and users alike.

Contributors to the Symposium are therefore invited to submit under following topics:

- Water saving and salinity control in arid and semiarid regions;
- Controlling waterlogging and salinity through improved water management and adequate drainage;
- Water quality management in irrigated agriculture: combination of water management and agricultural practices to reduce leaching;
- Managing the disposal of drainage water to avoid pollution of receiving water bodies and damage of wetlands caused by salts and toxic agricultural chemicals;
- Establishing appropriate guidelines, rules and standards for managing the use/reuse of low quality water in irrigation;
- Surface and ground water quality monitoring, assessment and modeling;
- Method for managing leaching of salt accumulated in soil;
- Estimation of future degradation of soil and groundwater by accumulation of salt;
- Disposal/treatment of heavily contaminated water.

D. SEMINAR : Management of historical/traditional irrigation projects

Coordinator : Prof. N. Hatcho (Japan)

The Working Group on History of irrigation, Drainage and Flood Control Projects is soliciting papers from National Committees on case studies of management of historical/traditional irrigation projects, especially those dealing with flood management.

SCHEDULE**Due Date****A. Congress Questions**

- ❖ Submission of comprehensive “summary and conclusions” of at least 500-600 words of proposed papers to the Central Office by National Committees **01 September 2004**
- ❖ Result of review/screening of “summary and conclusions” to be intimated by the Special Committee consisting of General Reporter and Panel Experts to the Central Office **30 November 2004**
- ❖ Intimation of acceptance of “summary and conclusions” of proposed papers by the Central Office to National Committees and authors **15 December 2004**
- ❖ *Receipt of full text of accepted papers in electronic format and three hard copies in the Central Office **01 March 2005**

B. Special Session

- ❖ National Committees to intimate name(s) of author(s) of paper to the Central Office **01 August 2004**
- ❖ Submission of comprehensive “summary and conclusions” of at least 500-600 words of the proposed paper to the Central Office by National Committees **01 September 2004**
- ❖ Result of review/screening of “summary and conclusions” to be intimated by the Special Committee to the Central Office **30 November 2004**
- ❖ Intimation of acceptance of “summary and conclusions” of proposed paper by the Central Office to National Committees and authors **15 December 2004**
- ❖ *Receipt of full text of accepted papers in electronic format and three hard copies in the Central Office **01 March 2005**

C. Symposium

- ❖ National Committees to intimate name(s) of author(s) of paper to the Central Office **01 August 2004**
- ❖ Submission of comprehensive “summary and conclusions” of at least 500-600 words of the proposed paper to the Central Office **01 September 2004**
- ❖ Result of review/screening of “Summary and Conclusions” to be intimated by the Coordinator to the Central Office **30 November 2004**
- ❖ Intimation of ICID’s approval of “summary and conclusions” by the Central Office to National Committees and authors **15 December 2004**
- ❖ *Receipt of full text of accepted papers in electronic format and three hard copies in the Central Office **01 March 2005**

D. Seminar

- ❖ National Committees to intimate name(s) of author(s) of paper to the Central Office **01 August 2004**
- ❖ Submission of comprehensive “summary and conclusions” of at least 500-600 words of the proposed paper to the Central Office **01 September 2004**
- ❖ Intimation of ICID’s approval of “summary and conclusions” to National Committees and authors by the Coordinator under intimation to the Central Office **15 December 2004**
- ❖ *Receipt of full text of accepted papers in electronic format and three hard copies in the Central Office **01 March 2005**

* The papers can also be sent through e-mail alongwith the photographs, drawings embedded in the electronic version. Photographs, drawings, sketches etc. should be sent in original separately for getting better resolution in print.

SUBMISSION OF PAPERS

Three copies of a comprehensive “summary and conclusions” of at least 500-600 words of the paper proposed for the Congress are required to be sent together with the proforma given at Annex 2 (page 18) to the ICID Central Office no later than 1 September 2004. For definition of “summary and conclusions” refer to Annex 1 on page (17). The National Committees and international organizations can contribute papers for the Congress as follows.

A. Congress Questions

Each National Committee and international organization may submit one or several papers on the basic Questions of the Congress. Other invited international organizations may submit only one paper.

Nationals of non-member countries can also submit papers on the Congress Questions provided they bear charges at a rate of US\$ 10 per page of the paper.

B. Special Session

Each National Committee and international organizations shall submit only one paper on any aspect(s) of the theme of the Special Session.

C. Symposium

The total number of papers for Symposium shall be limited to about 12. Not more than one paper will be accepted from a National Committee.

D. Seminar

The total number of papers for Symposium shall be limited to about 12. Not more than one paper will be accepted from a National Committee.

SELECTION OF PAPERS

Congress Questions and Special Session

In addition to the initial screening of the proposed papers (“summaries and conclusions”) at the National Committee level, papers for the Congress Questions and Special Session will be further screened at the international level by the concerned Special Committee consisting of the General Reporter and Panel Experts. Only 5-10 papers will be finally selected per sub-topic of the two basic Questions for presentation at the Congress and for inclusion of the full-text of papers in the Congress transactions on CD-ROM. In order to give opportunity to greater number of authors to make their presentation and have a closer and

intensive interaction with the international participants, poster sessions will be organized for the Congress Questions. Full text of all accepted papers either for presentation at the Congress session or at the poster session will be published in the Congress transactions on CD-ROM. Three categories of authors for poster sessions will be:

- (1) Authors who wish to present a paper in poster form only;
- (2) Authors of selected papers who wish to complement their papers with posters for its better comprehension (colour photographs, etc.);
- (3) Authors to whom the special committee, consisting of General Reporter and Panel Expert, indicate to present their paper as poster.

The decision of the Special Committee for Questions and Special Session regarding acceptance of papers with or without modifications, or rejection of any paper shall be final.

Symposium and Seminar

The papers will be reviewed by the Coordinators for Symposium and Seminar. His/her decision regarding acceptance of the paper with or without modifications, or not accepting the same shall be final.

GUIDELINES FOR AUTHORS FOR PREPARATION OF ACCEPTED PAPERS

1. Restrict to those aspects in which something original or of practical importance is to be contributed.
2. The range of each topic has been defined on the basis of the present knowledge of the topic. Original contributions on new aspects will be accepted on merits. Authors should note that a re-statement of well-known facts and principles, available in easily accessible publications, will not be accepted. However, if in presenting new facts and principles it becomes necessary to refer to old material, this may be done as briefly as clarity would permit. References may be given to help interested readers to go deeper into the subject.
3. Authors may bear in mind that the aim of the Congress is to pool experience and knowledge, not only in basic principles but also in regard to field studies and actual results obtained in different countries. In discussing fundamental principles, however, authors should try, as far as possible, to refer mainly to their practical aspect. Experience has shown that purely academic discussions, whatever their intrinsic value, are not followed by the large majority of the audience in a Congress. It is, therefore, desirable that authors should concentrate and stress more on the practical aspects rather than the theoretical aspects. Again in discussing field results and practical

experience, fundamentals should not be ignored entirely. It is only by a proper understanding and analysis of a given experience that the result can achieve a sufficient generality to be useful in similar circumstances elsewhere.

4. The language of the paper should be either English or French.
5. The length of the paper should not exceed 2,000 words for case studies (i.e. equivalent of about 8 pages A-4 size, typed in double space, including tables and figures) and 4,000 words for scientific/technical papers (i.e. equivalent of about 15 pages of A-4 size, typed in double space, including tables and figures).
6. The title of the paper should be as brief as possible, preferably not exceeding 70 characters and spaces. The translation of the title into the other language (in French if the paper is in English and vice versa) should appear below the title in the language of the paper.
7. The author's full name should appear below the title of the paper in the other language (see item 6 above) and a footnote reference stating present employment and complete address, fax, email, telephone etc., must appear on the first page of the paper.
8. The paper should contain an abstract of about 250 words in the language of the paper (English or French) and a "summary and conclusions" of about 500-600 words in the other language (French or English). The "abstract" and the "summary and conclusions" should precede in that order the text of the paper. Guidelines for preparing abstract and "summary and conclusions" are given in Annex 1. Examples of the layout of pages, figures and tables are given in Annex 3.
9. It is imperative that the paper to be submitted must not have been published elsewhere prior to the date of the Congress. Material of an advertisement nature will not be accepted.
10. The paper must be written in the third person.
11. The data and numerical information should be given in metric units; and if necessary, equivalent units in British system should appear in brackets.
12. Detailed references should be given to quotations at the end of the text of the paper. References should be arranged in an alphabetical order according to author's surname. The arrangement in an individual reference should be as under:

Name(s) of author(s). Year of issue. Title of publication or article. Name of Periodical or publisher, volume number, issue number, page numbers, language (if other than that of the paper). Example:

Broner, I. and R.R.P. Law. 1992. Water balance for irrigation using ET Input. ICID Bull. 41(2): 173-182.

GUIDELINES FOR AUTHORS FOR PREPARING ELECTRONIC AND HARD COPIES

The full text of all papers will be available on CD-ROM. In addition, Transactions of the Congress will be published in hardcopy. The Transactions will contain all keynote addresses, general reports, and abstracts of all papers. Authors are required to supply three hard copies of their paper along with an electronic version **under Windows environment**.

Authors are advised to strictly follow the following guidelines for preparation of electronic and hard copies.

Layout of text

- As mentioned in the “Guidelines to authors for preparation of papers”, the title of the paper and below that the title of the paper in the other language (in French if the paper is in English and vice versa) and the author’s name are to appear on the first page of the paper. The author’s present employment and complete address must also appear as a footnote at the bottom of the first page, separated from the text by a 4-cm rule.
- The title of the paper should be in bold capital letters in centre of page, and the author’s name two type spaces below the last line of the title in the other language. If there are more than one author, these should be in the same line one after another. Names of three authors can be conveniently accommodated in one line.
- Use quadruple spacing between the author’s name and the first main heading. Thereafter use double spacing between headings and paragraphs and between paragraphs.
- Main headings to be in capital letters in centre of page.
- Sub-headings to be in bold small letters, starting flush with the left-hand margin.
- Indent the paragraphs.
- An entire minor section may be indented for emphasis.
- Use single spacing in the text. If a line contains scripts or indices, use 1-1/2 spacing between that line and the text.
- Give equations/formulae in the centre of the page using 2-1/2 spacing between text and equation, and in between equations.
- The captions of figures and tables should be given in two languages – in the language of the paper as well as in the other language (in French if the paper is in English and vice versa).

Figures

- **Insert figures in the appropriate area with a separate copy of the figures in another file. The inserted figures are required in high resolution format (tif, gif, jpeg etc.).**
- Make no distinction between diagrams and photographs. Refer them just as figures in the text. Number figures consecutively with Arabic numerals in the order reference is made to them in the text.
- Insert figure(s) as close as possible to its/their first reference in the text.
- Leave suitable blank spaces for figures while keying in the text of the paper in the computer.
- Type caption at the bottom of the figure in centre in both the official languages as show below:

Figure 1. Irrigation supply and demand (Fourniture et besoins en eau d'irrigation)

- The word "Figure" and the figure number should appear in bold lower case as "**Figure 1**".
- Figures may be either 120 mm wide or less. Full page figures to be in size 120 mm x 180 mm or 190 mm x 110 mm.
- All lines in drawings should at least be 0.2 mm thick.
- Line drawings should be made with black ink on drawing/tracing paper.
- Avoid excessive notes in figures.
- Photographs should be black and white, with good contrast and on glossy paper.
- **Stick** xerox copies of figures/photographs at their respective places in the hard copies. Enclose original figures and photographs separately.

Tables and formulae

- Insert tables and formulae as close as possible to their first reference in the text.
- Formulae, if more than one, may be numbered consecutively.
- Number tables consecutively in Arabic numerals and provide them with suitable headings at the top in table centre in both official languages as shown below:

Table 1. Performance indicators of irrigation technology (Indicateurs de performance de la technologie d'irrigation).

- Type "**Table 1.**" In bold lower case.
- Avoid abbreviations in column headings and indicate units in the line immediately below the heading.
- Give explanations, if any, at the bottom of the table, and not within the table itself.

Hard copy

Hard copy is to be prepared on A-4 (210 mm x 297 mm) sheets with a print area 150 mm (wide) by 250 mm.

PUBLICATION COSTS

The National Committees and international organizations associated with ICID can submit one or more papers for each of the Congress Questions but the Commission will meet the cost of inclusion of only **25 pages per Question** in the CD-ROM; any additional pages will be included at their cost. Similarly in the case of the papers for the Special Session and the Symposium, the Commission will meet the cost of including of only **15 pages** for each in the CD-ROM, per National Committee and the international organization. The cost per additional page will be **US\$ 10**.

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GUIDELINES FOR PREPARING ABSTRACTS AND “SUMMARIES AND CONCLUSIONS” OF PAPERS FOR ICID CONGRESSES

1. Definitions

1.1 Abstract is a shortened or condensed version of the essential points of the paper within the prescribed limit of space. It should be an informative abstract providing “current awareness” information, i.e. the problem how tackled (procedure and methods), factual resultant data and discussion, results and conclusions, in a condensed and convenient form.

1.2 “Summary and conclusions” is more comprehensive than information abstract and contains more detailed information about the contents and conclusions of the paper. Besides enabling the busy reader to decide more surely than he can from the mere title of the paper whether it merits his reading or not, the purpose of the “summary and conclusions” is to enable the scrutineers to make correct appraisal of suitability or otherwise of the paper for the purpose for which it is being submitted.

2. Role of abstracts and “summaries and conclusions” of ICID papers

The official languages of the Commission are English and French. Papers are accepted in either of the two languages adopted by the author(s). Abstracts and “summaries and conclusions” of the papers for the Congress Questions, Special Session and the Symposium are invariably published simultaneously with the papers themselves. Accordingly all papers should contain an **abstract** in the language adopted by the author and also a **“summaries and conclusions”** in the other official language of the Commission.

3. Size of abstracts and “summaries and conclusions”

3.1 Abstract: about 250 words.

3.2 Summary and conclusions : about 500-600 words.

19th ICID CONGRESS, BEIJING, CHINA, 2005

PROFORMA TO BE COMPLETED BY AUTHORS WHILE SUBMITTING
DETAILED "SUMMARY AND CONCLUSIONS" OF PROPOSED PAPER

1. Title of the proposed paper
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2. State whether the paper is for Congress :
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Question 53
Special Session
Symposium

3. Specify the sub-topic (or the general aspect) to which the paper relates
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Annex 3

EXAMPLE OF LAYOUT OF PAGES, FIGURES AND TABLES

**IRRIGATION FINANCING POLICY AND INSTITUTIONAL
CHANGE IN THE PHILIPPINES****POLITIQUE DE FINANCEMENT DE L' HYDRAULIQUE AGRICOLE
ET CHANGEMENT INSTITUTIONNEL AUX PHILIPPINES****Mark Svendsen¹****ABSTRACT**

Irrigation investment in Asia has fallen sharply over the past decade, increasing the importance of improved performance in existing irrigation systems. An underutilized mechanism for accomplishing this, while reducing the drain on the government treasury, is the restructuring of irrigation agencies into financially-autonomous entities. In 1975, the Philippine government phased out operating subsidies to its National Irrigation Agency (NIA) over a 5-year period while allowing the agency to collect and retain its own revenues from farmers. NIA responded by (a) devolving responsibility for system management tasks to organized groups of farmers, (b) holding fee-based income constant in the face of deteriorating domestic terms of trade for agriculture, (c) slashing system operating costs, and (d) providing performance-based financial incentives to field staff. As a result, NIA recorded a net operating profit for the first time in 1979 and in 6 of the 7 years thereafter. At the same time, dry season area irrigated showed a 13 percent increase in sample systems. The programs developed by the agency to accomplish this are elaborate but straightforward and offer useful guidance to other countries faced with a similar challenge.

RESUME ET CONCLUSIONS

Depuis le milieu des années 60, le taux de croissance des surfaces irriguées en Asie a baissé de 72 %, ce qui suscite de graves inquiétudes au sujet de l'orientation et de l'avenir de la croissance agricole et du développement de cette région. L'application de techniques d'irrigation améliorées afin d'accroître la productivité des systèmes d'irrigation actuels, ne s'est pas avérée une option particulièrement réussie par le passé. Une seconde option, moins bien connue, consiste à modifier de façon fondamentale les techniques de gestion des systèmes d'irrigation utilisées traditionnellement. L'une des options qui comportent de bonnes chances de succès, consiste à doter l'agence d'irrigation d'une autonomie financière, et de changer radicalement les règles et les incitations qui déterminent les résultats de l'agence et de son personnel.

En 1975, le gouvernement des Philippines a pris des mesures visant à assainir la situation financière du service de l'irrigation (National Irrigation Administration - NIA) en éliminant progressivement les subventions au budget d'exploitation pendant une période de 5 ans, tout en permettant à l'agence de recouvrer ses ressources propres

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auprès des agriculteurs et de les retenir. La National Irrigation Administration (NIA) a réagi par les mesures suivantes :

- restitution de la responsabilité en ce qui concerne certaines tâches de gestion du système à des groupes organisés d'agriculteurs
- maintien du revenu des commissions à un niveau constant en dépit d'une détérioration des termes de l'échange intérieurs des produits agricoles
- réduction sensible des coûts d'exploitation du système et
- octroi de primes de rendement au personnel de la NIA sur le terrain.

De ce fait, pour la première fois, la NIA a réalisé un bénéfice d'exploitation net en 1979 et pendant six des sept années qui ont suivi. Auparavant, le Trésor fournissait à la NIA une aide budgétaire annuelle importante. Dans le même temps, les surfaces moyennes irriguées en saison sèche ont augmenté de 13 % dans cinq systèmes échantillon, après avoir tenu compte des changements apportés à l'adduction d'eau.

Il ne faut pas sousestimer l'importance de ces réalisations. Contrairement au nombre de services nationaux d'irrigation de la région qui se sont cramponnés à des règles et pratiques d'exploitation vieilles de plusieurs décennies, voire de plusieurs siècles, la NIA s'est transformée en une agence moderne orientée vers la gestion décentralisée, capable de changer ses objectifs, de s'assigner des objectifs et de gérer ses ressources de manière afin d'atteindre ces objectifs. Les documents dans lesquels sont consignés les mesures prises par le gouvernement et par la NIA pour accomplir cette transformation, sont disponibles. Ces mesures représentent des enseignements utiles pour d'autres pays qui souhaitent faire en sorte que leurs systèmes d'irrigation soient autonomes du point de vue financier, et améliorer le potentiel des systèmes d'irrigation concernés.

Des questions persistent. Il y a, en particulier, l'importante question de savoir quelles répercussions le fait que la NIA attache tellement d'importance à sa viabilité financière, a sur la réalisation de son mandat global qui est de fournir des services d'irrigation adéquats et en temps voulu aux agriculteurs. Il existe des liens évidents entre ces deux objectifs mais la nature exacte de ces liens n'est pas bien précisée. Néanmoins, la NIA, après avoir renforcé sa capacité de faire face au changement, est mieux à même de s'évaluer et de modifier ses objectifs afin de mieux réaliser ses objectifs sociaux plus larges. Toutefois, il est crucial que cela se fasse dans le respect des politiques de financement nationales qui exigent que la NIA jouisse de l'autonomie financière si l'attachement institutionnel fondamental à la gestion doit être préservé. Les solutions tendant à un retour à un système qui est tributaire des recettes fiscales générales, et qui est sous l'emprise directe de l'Etat, risquent fort de compromettre ces acquis.

1. INTRODUCTION

Since the mid-1960s the growth rate of irrigated area in the world has declined by about 60 percent; in Asia it has declined by 72 percent. Accompanying this

slowing in the rate of expansion is a sharp reduction in irrigation investment. In Asia, where the bulk of the world's irrigation is found, aggregate investments by four major international donors² fell by about 50 percent, in real terms, between 1977-79 and 1986-87. These trends raise serious concerns about the direction and future of irrigation in Asia and its implications for agricultural growth and development (Rosegrant and Svendsen, 1992).

One resulting implication is that the hydrologic and agricultural performance of existing irrigation systems must improve if current rates of growth in agricultural output are to be sustained. Complicating this already challenging task, however, are several concurrent trends and conditions. These include increasing competition between irrigation sectors and municipal and industrial users of water, and the serious financial straits in which many Asian governments currently find themselves. The first of these factors thwarts the traditional solution of augmenting overall system water supply to improve water adequacy in poorly supplied portions of a system. The second factor largely precludes simply budgeting more money for irrigation system operations and maintenance, and higher levels of support to the agricultural sector.

What options are then available to us in attempting to improve the performance of Asian irrigation systems? One promising avenue is clearly new technology. This is a fundamental source of growth in output and productivity in any economic system, and continuing efforts to develop improved technology which will be effective in the Asian context are warranted. We must keep in mind, however, the very spotty record on our experience to date in adapting technology, successfully employed in the West, to a developing country setting, and the strong dependence of new farm-level technology on an effectively-managed main system.

4. NIA RESPONSES

NIA management responded to these charter changes with a fourfold strategy aimed at bringing its costs and revenues into balance. The strategy comprised actions to :

- Devolve responsibility for certain operational, maintenance, and fee-collection tasks to farmers,
- Increase corporate revenues by raising fees, improving collections, and generating secondary income from ancillary activities,
- Reduce operating costs through a series of minor economies and through major cuts in the personnel budget, and
- Provide financial incentives for superior performance to outstanding field units and to individuals in them.

² World Bank, Asian Development Bank, United States Agency for International Development, and Japanese Overseas Economic Cooperation Fund.

4.1 Devolution

In 1980, following earlier successes in organizing farmers in the small-scale communal irrigation sector, NIA began experimenting with ways to organize farmers in its larger systems into effective irrigators' associations which could assume responsibility for some canal maintenance and water allocation functions. By 1986, the area under various forms of farmer management had reached about 100,000 hectares out of a total of about 600,000 hectares of publicly-managed irrigation in the country. Schemes were classified as Stage I, II, or III, depending on the amount of responsibility transferred, with Stage III denoting the most extensive devolution of responsibility to farmers.

Table 1 shows the impact of these transfers in five sample systems. Depending on the specific type of devolution, reductions in NIA's staffing levels in the affected systems ranged from 13 to 75 percent. This suggests a significant reduction in NIA's operating costs, though not necessarily in total system operation costs, since the costs now borne directly by farmers are not included.

Table 1. NIA employees before and after introduction of joint management (Employés de la NIA avant et après l'introduction de la gestion conjointe)

| NIS | Stage | Employees | | | | | |
|----------|-------|------------|-------|-------|------------|-------|-------|
| | | Before | | | After | | |
| | | Operations | Admin | Total | Operations | Admin | Total |
| Bago | I | 81 | 11 | 92 | 64 | 16 | 80 |
| Banurbar | II | 10 | 3 | 13 | 2 | 3 | 5 |
| Maramag | II | 6 | 4 | 10 | 3 | 4 | 7 |
| Bucaao | II | 8 | 9 | 17 | 7 | 3 | 10 |
| MNOH | III | 17 | 7 | 24 | 2 | 4 | 6 |

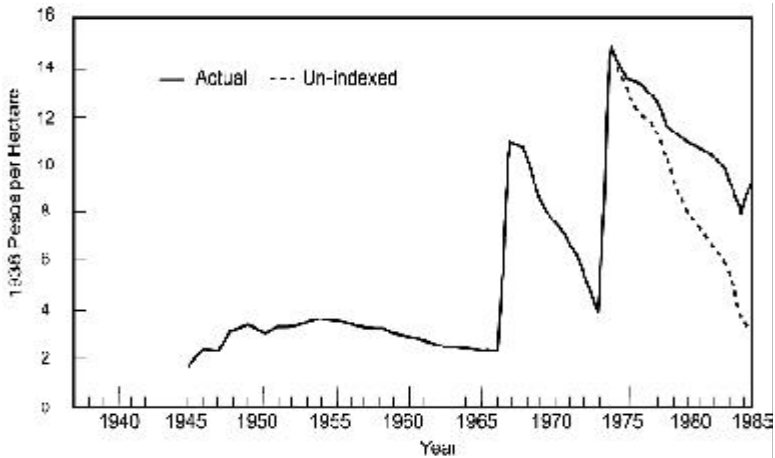
Sources : Jopillo and de los Reyes, 1988 and Salandanan, 1988

Note : NIS stands for National Irrigation System.

NIA's income, operating expenses, and net income for these same systems are shown in Table 2. Income in 4 of the 5 systems increased following the shift to joint management, while operating expenses declined in 4 of the 5. Net income increased substantially in three of the systems and the operating deficit was reduced in a fourth. Net income declined slightly for the fifth system due to a sharp increase in NIA's operating costs. From NIA's point of view the change appears to have been a distinct success in financial terms.

4.2 Increase revenue

Immediately following the 1974 charter amendment, NIA obtained permission to increase its ISF rates. At the same time, fees were indexed for inflation by denominating them in measures of paddy. The effect of this increase, in real terms, is shown in Figure 2.



Sources : NIA (1986), Golay (1961), International Financial Statistics (1986)

Figure 2. Irrigation fee rates - Double crop diversion systems, 1938 prices (Tarifs des charges au titre de l'irrigation - Systèmes de déviation de double culture, prix de base 1938)

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