

APPLICATION FOR BEST PERFORMING WORKBODY AWARD (BPWA)
WORKING GROUP ON SUSTAINABLE DEVELOPMENT OF TIDAL AREAS
(WG-SDTA)

1. Background to establish WG-SDTA

The coastal zone comprises only 3 % of the earth's surface, but contains a high amount of its assets and three quarters of world population will live within 100 km of the sea by 2025. Due to the necessity of more land and water, the tidal areas have not been developed only for agricultural land but also for fishery and trade spaces in the world. As natural resources on earth, tidal areas should be protected in one hand and developed in a sustainable way on the other.

To achieve these objectives, comprehensive studies, ICID established the Working Group on Sustainable Development of Tidal Areas (WG-SDTA) during Montreal ICID Congress in 2002. [For detail information, please](#) refer to Chapter 1 of our Handbook "Towards Sustainable Development of Tidal Areas". In addition, WG-SDTA has been approved to extend for five years from 2011 to study on Sustainable Management of Tidal Areas including publication of the 2nd Handbook and preparation of the Special Issue on SDTA to be published in the Journal of ICID and dissemination of study result and valuable experience among the NCs and related organizations

2. Purpose of the Working Group

- First Stage (2001-2009)

Tidal areas are readily converted to cultivatable areas with poldering and drainage. At present, there are two major needs. One is to develop these areas to meet the demand of land for agriculture, housing and industry. The other is to preserve these areas to provide a better living environment for humans as well as flora and fauna. On this basis, the purpose of WG-SDTA is as follows, and had announced a Position Paper based on our working group's purpose.

- To collect information about the natural environment behavior in tidal areas around the world
- To identify sustainable development and conservation options in the tidal areas
- To find a balance between the preservation and development of tidal areas.

- Second Stage (2010-)

Tidal areas, with abundant ecosystems, are important interactive water-land environments. Due to the global climate change, tidal areas are threatened complicatedly by rising sea level, extreme floods events and droughts and so on.

It is hence urgent to revisit the past design and management system, operational standards and rehabilitation methods of the existing irrigation and drainage facilities, and review the progression of natural and constructed wetlands in near shore, estuary, and tidal flat areas.

Also, in order to better understand the changing tidal area environment, we have to introduce enhanced survey techniques and systematic monitoring programs in the tidal area.

Under the pressure of human activities, tidal land area in many countries has been subsiding due to over-pumping groundwater. Problems such as sea water intrusion, land salinization, and decreasing land value could then occur in higher potential. While tacking with the extreme events, ICID WG-SDTA should initiate more discussions on and raise awareness of the increasing risk on tidal areas by joining international dialogues and organizing international conferences in cooperation with related WG, such as WG-DRG, WG-CLIMATE and WG-ENV, supported by various NCs who are concerned with Tidal areas.

As the ultimate goal for WG-SDTA is to find a balance between the preservation and development of tidal areas, and thus provide relevant experiences to assist island, developing, and undeveloped countries.

In addition, WG SDTA will derive feasible strategies of sustainable management of lowland, watershed, and water and land resources to reduce the risk or appropriate exploitation of tidal and ocean energy to reduce carbon dioxide emissions should be formed.

- (i) Identify sustainable management options of lowland, watershed, as well as sustainable development and management of water and land resources in tidal areas.
- (ii) To raise awareness of the increasing risk on tidal areas due to global climate change, stimulate discussion on impacts and mitigation, and find a balance between the preservation and development of tidal areas.
- (iii) To enhance survey, design techniques and monitoring and management programs for the irrigation and drainage facilities, and apply to collect information about the tidal area environment around the world.
- (iv) To review the progression of natural wetland conservation and constructed wetland development in tidal areas.
- (v) To join the international dialogue and organize international conferences to promote land and water management in tidal areas as well as evaluate the feasibility of tidal energy exploitation under global climate change.
- (vi) To collaborate with other related working groups actively, and to exchange relevant experiences amongst NCs and support for developing, and least developed countries.

3. Scope of Work

- Specific issues to be covered by the WG-SDTA were divided into:
 - identify criteria or decision supporting system to find sustainable development schemes for the planning and design of dikes and related structures
 - Integration of irrigation, drainage and flood management in reclaimed area
 - The physical, chemical and biotic characteristics of the tidal areas
 - Management and institutional aspects and production system in reclaimed area
 - Community participation in the conservation of agricultural land
 - Socio-economic impacts and cost/benefit analysis of various development alternatives
 - Historic aspects of tidal reclamation
 - Integrated approaches for sustainable development and conservation options
- Enlisting members for WG-SDTA
- Technical publications brought out by WG-SDTA
- Number of publications with titles, under preparation by WG-SDTA
- Timely achievements of targets set out by WG-SDTA in its rolling plans
- Attendance of members at meetings and their contribution to activities of the IEC Workbody
- Workshops organized by WG-SDTA at ICID Congress
- Workbody contributions to new initiatives of ICID
- Participation/contribution of WG members in other International Programs
- Papers submitted by WG members to ICID Conferences/ICID Journal/other Journals
- Website of WG-SDTA and services offered through it

4. Membership of WG-SDTA

2002 The 1st meeting of WG-SDTA in Montreal, Canada

Members Present: (1) Dr. Park, Sang Hyun, Chairman (Korea, Rep. of); (2) Mr. Jonathan Simm, Vice-Chairman (UK); (3) Ir. Henk P. Ritzema, Secretary (The Netherlands); (4) Ir. Mohd. Azhari Ghazalli (Malaysia); (5) Mr. Cai Lingen (China); (6) Dr. Indreswari Guritno (Indonesia); (7) Dr. S. Taniyama (Japan); (8) Dr. Harry Denecke (FAO)
Observers: (1) Mr. Ueda Kazuni (Japan); (2) Mr. Folkert de Jager, (The Netherlands); (3) Mr. Daesu Eo (Korea, Rep. of).

2003 The 2nd meeting of WG-SDTA in Montpellier, France

Members Present: (1) Dr. Park Sang Hyun, Chairman (Korea, Rep. Of); (2) Mr. Jonathan Simm, Vice Chairman (Great Britain); (3) Ir. Henk P. Ritzema, Secretary (The Netherlands); (4) Ir. Mohd. Azhari Ghazalli (Malaysia); (5) Mr. Hugh Turrall (Australia); (6) Mr. Cai Lingen (China); (7) Dr. Indrewswari Guritno (Indonesia); (8) Dr. S. Taniyama (Japan); (9) Dr. Harry Denecke (FAO/IPTRID); (10) Mr. E.J. James (India); (11) Secretary General, ICID.
Observers: (i) Mr. Daeou Eo (Korea, Rep. Of); (ii) Mr. Robiyanto Hendro Sustanto (Indonesia); (iii) Mr. Ueda Kazuni (Japan).

2004 The 3rd meeting of WG-SDTA in Moscow, Russia

Members Present: (1) Dr. Sang Hyun Park, Chairman (Korea, Rep of); (2) Ir. Jonathan Simm, Vice Chairman (Great Britain); (3) Mr. Ueda Kazumi (Japan); (4) Mr. Bernd Probst (Germany); (5) Mr. Cai Lingen (China); (6) A. Ghazalli (Malaysia);
Observers: (1) Dr. S. Taniyama (Japan); (2) Kim YongDeuk (Korea)

2005 The 4th meeting of WG-SDTA in Beijing, China

Members present: (1) Dr. Park Sang Hyun, Chairman (Korea, Rep. of); (2) Mr. Jonathan Simm, Vice Chairman (Great Britain); (5) Mr. Cai Lingen (China); (6) Dr. Indreswari Guritno (Indonesia); (7) Mr. Ueda Kazumi (Japan); (8) Mr. Bernd Probst (Germany);
Observers: (i) Dr. E. Lübbe – chairman ERWG (Germany); (ii) Mr. P. Borrows – Environment Agency (UK); (iii) Dr. K. Hiramatsu, Mr. T. Yaokawa, Mr. K. Tanaka, Dr. S. Taniyama and Prof. M Kuroda (Japan); (iv) Mr. S. W. Lee, Dr. D. B. Lee; Mr. B.H. Lee and Dr. Y.M. Huh (Republic of Korea); (v) Mr. N. Chol and Mr. R.H. Gun (Democratic Peoples' Republic of Korea); (vi) Dr. Lee Loke Chong (Malaysia); (vii) Mr. S. Thanopanuwit (Thailand) (viii) Mr. R. Stefaski (World Meteorological Organisation)

2006 The 5th meeting of WG-SDTA in Kuala Lumpur, Malaysia

Members Present: (1) Dr. Park Sang Hyun, Chairman (Korea, Rep. of); (2) Mr. Jonathan Simm, Vice Chairman (Great Britain); (3) Ir. Henk P. Ritzema, Secretary (The Netherlands); (5) Prof. Cai Lingen (China); (8) Dipl. Ing. Bernd Probst (Germany);
Observers: (i) Prof. Soon-Kuk Kwun (Korea, Rep. of); (ii) Mr. Joongdae Choi (Korea, Rep. of); (iii) Mr. A. Hafied A. Gany (Indonesia); (iv) Mr. John Dunn (Great Britain); (v) Dr. Lee Deog Bae (Korea, Rep. of); (vi) Mr. Tai Cheo Kim (Korea, Rep. of); (vii) Mr. Euchivo Kitabayashi (Japan); (viii) Dr. Kim Hong Sang (Korea, Rep. of); (ix) Mr. Henri Tardieu (France); (x) Mr. Takeshi Minakawa (Japan); (xi) Mr. Hiroshi Ikeura (Japan); (xii) Mr. Sun Joo Kim (Korea, Rep. of); (xiii) Mr. Mohammad Nurul Islam (Bangla Desh); (xiv) Mr. Dae-Sik Kim (Korea, Rep. of); (xv) Mr. Hidekazu Tagashira (Japan); (xvi) Mr. Fred Stepanich (USA).

2007 The 6th meeting of WG-SDTA in Sacramento, USA

Members present: (1) Dr. Park Sang Hyun, Chairman (Korea, Rep. of) (4) Ir. Mohd. Azhari Ghazalli represented by Mr. Teoh Weng Chaw (Malaysia); (6) Dr. Indreswari Guritno, represented by Dr. HAFIED Gani (Indonesia); (9) Mr. Ueda Kazumi (Japan)
Observers: (i) Dr. S. Taniyama (Japan), (ii) Kazumi Hiramatzu (Japan), (iii) Hachio, Satoru Yoshimi, (Japan), (iv) Yoshinari Ishkawa (Japan), (v) Kenji Seiyama (Japan), (vi) Hirishi Ikeura (Japan), (vii) Jos. Van Alphen (Netherlands), (viii) Ruy-Chy Kao (Chinese Taipei), (ix) Yih-Chi Tan (Chinese Taipei), (x) Weng Chaw (Malaysia), (xi) Lee Bong Hoon (Korea, Rep. of); (xii) Lim Jong Wan (Korea, Rep. of); (xiii), (xv) Soon Kuk Kwun (Korea, Rep. of); (xvi) Jeong Woo, Na (Korea, Rep. of); (xvii) Kyoung-Soo, Kim (Korea, Rep. of)

2008 The 7th meeting of WG-SDTA in Lahore, Pakistan

Members present: (1) Mr. Ma Jianming (China) represented Vice President Hon. Prof. Cai Lingen; and (2) Dr. Vijay K. Labhsetwar represented Secretary General, ICID.
Observers: Nil.

2009 The 8th meeting of WG-SDTA in New Delhi, India

Members present: (1) Dr. Park Sang Hyun, Chairman (Rep. of Korea 2002); (2) Dr. Inreswari Guritno (Indonesia, 2002) represented by Vice President Hafied A. Gany; (3) Mr. Ueda

Kazumi (Japan, 2003); (4) Dr. Ruey-Chy Kao (Chinese Taipei, 2007); and (5) Secretary General, ICID represented by Dr. Vijay K. Labhsetwar, Director, ICID.
 Members Hon.: VPH Henri Tardieu (France) and VPH Ricardo Segura (Spain).
 Observers: (i) Dr. Hsiao-Wen Wang (Chinese Taipei); (ii) Dr. Sudhir Bhongle (India); (iii) Er. Dhimant B. Yyas (India); (iv) Ms. Chu-Yi Liu (Chinese Taipei); (v) Mensi Bhai Shriya (India); (vi) Dr. Park Kwang Soo (Korea); (vii) Ms. Pin-Han Kuo (Chinese Taipei); (viii) Mr. Kim Kwan (Korea); (ix) Dr. Park Chang Youn (Korea); (x) Mr. Park Aelan (Korea); (xi) Dr. Park Kwangsoo (Korea); (xii) Mr. L.M. Patel (India); (xiii) Mr. Kang. Jae HO (Korea); (xiv) Mr. Premji Bhai Patil (India); (xv) Mr. Vincent Bernard (France); (xvi) Mr. Maurice Roos (USA); (xvii) Dr. Kiwook Park (Korea); (xviii) Mr. Seukhun Joo (Korea); (xix) Dr. Kyu Yull Choi (Korea); (xx) Mr. Cjoongade Choi (Korea); (xxi) Prof. N. Hatcho (Japan); (xxii) Mr. K.M. Shah (India); and (xxiii) Mr. Rajendra Pawar (India).

2010 The 9th meeting of WG-SDTA in Yogyakarta, Indonesia

Members present: (1) Dr. Park Sang Hyun, Chairman (Korea, Rep. of 2002); (2) Ir. Henk P. Ritzema, Vice-Chairman (The Netherlands, 2009) represented by PH Bart Schultz; (3) Dr. Ruey-Chy Kao, Secretary (Chinese Taipei, 2009); (4) Dr. Indreswari Guritno (Indonesia, 2002); (5) Mr. Ueda Kazumi (Japan, 2003); (6) Secretary General, ICID represented by Dr. Vijay K. Labhsetwar, Director, ICID Central Office, New Delhi.

Observers: (i) Dr. Jo Jin Hoon (Korea, 2009); (ii) Dr. Daesu Eo (Korea, Rep. of) represented by Myung-Chul Eom

Others: (i) Young Jin Yoo (Korea, Rep. of); (ii) Prof. Dr. Hsiao-Wen Wang (Chinese Taipei); (iii) Ivan Chen (Chinese Taipei); (iv) Chun-Yi Liu (Chinese Taipei); (v) Hunoun Lee (Korea); (vi) Dong Kwun Kim (Korea); (vii) Nham Woo (Korea); and (viii) Joong Dae Choi (Korea).

Table 1 Membership of WG-SDTA

Name	Country	Nature of Work	Remark
Dr. Park, Sang Hyun, Chairman	Korea	Director of Yeoryung Branch Office (KARICO).	(1)
Ir. H.P. Ritzema, Vice Chairman	The Netherlands	Senior Researcher, ALTERRA-ILRI.	
Prof. Ruey-Chy Kao, Secretary	Chinese Taipei	Deputy Director of Tainan Hydraulics Laboratory, National Cheng Kung University	(1)
Dr. Indreswari Guritno	Indonesia	Vice Chairperson of the INACID	(1), (2)
Mr. Ueda Kazumi	Japan	Managing Director, Canal Improvement Construction Association of Japan.	
Dr. Hsiao-Wen Wang	Chinese Taipei	Assistant professor, Department of Hydraulic and Ocean Engineering, National Cheng Kung University	(1), (2)
Dr. Vijay K. Labhsetwar	ICID	Secretary General, ICID.	(1)

(1) Proportion of members from industrialized and developing countries.

- Members from industrialized countries are 5.

(2) Membership of Young Professionals and Women

- There are two distinguished woman member, Dr. Indreswari Guritno (Indonesia) and Dr. Hsiao-Wen Wang (Taiwan). Dr. Indreswari Guritno has been in charge of WG-ENV in the WG-SDTA.

5. Technical publications brought out by WG-SDTA

Since 2002, WG-SDTA has published five proceedings for the consequent International Workshops. The Title and details of the Proceedings are as follows:

- * 2002: International Workshop on Sustainable Development of Tidal Areas
 - Integrated approaches for sustainable agricultural and aqua cultural development
 - Planning and design of estuary dikes and reservoirs
 - Integration of irrigation, drainage and flood management in reclaimed area
 - Historic aspects of tidal development and conservation in the world

- * 2003: Wise Use and Environmental Conservation of the Tidal Areas
 - Operation and maintenance issues in reclaimed area
 - The physical and biotic characteristics before and after SDTA
 - The chemical and water quality characteristics of tidal swamps and estuaries

- * 2004: Socio-economic Management and Stakeholder Participation for Agriculture
 - Management and institutional aspects and production system in reclaimed area
 - Community participation in the conservation of agricultural land
 - Socio-economic impacts and cost/benefit analysis of various development alternatives

- *2008: International Workshop on Tidal area features and natural process
 - Henk Ritzema (The Netherlands): Handbook chapter 1 Introduction & chapter 7 Integrated decision support framework
 - Park Sang Hyun (Korea): Handbook chapter 2 Aspects of managing development of tidal areas
 - Ruey-Chy Kao (Taiwan): Handbook chapter 3 Tidal area features and natural process
 - Jo Jin-Hoon (Korea): Water Quality Improvement Measures in Saemangeum Lake

- *2009: Monitoring Systems for Sustainable Development of Tidal Areas
 - Application of Detention Wetland in Coastal Areas in Taiwan
 - Stream Monitoring for Water Quality Management: An Example of Upstream Monitoring in Sloping Alpine fields
 - Ensuring Inflow Water Quality for the Fresh Water Reservoir of the Gulf of Khambhat Development Project
 - Monitoring of Migratory Birds in Tidal Areas
 - Environmental Monitoring in Saemangeum Lake

There are five publications fulfilled by WG-SDTA from 2002 to 2011, as shown in Fig.1.

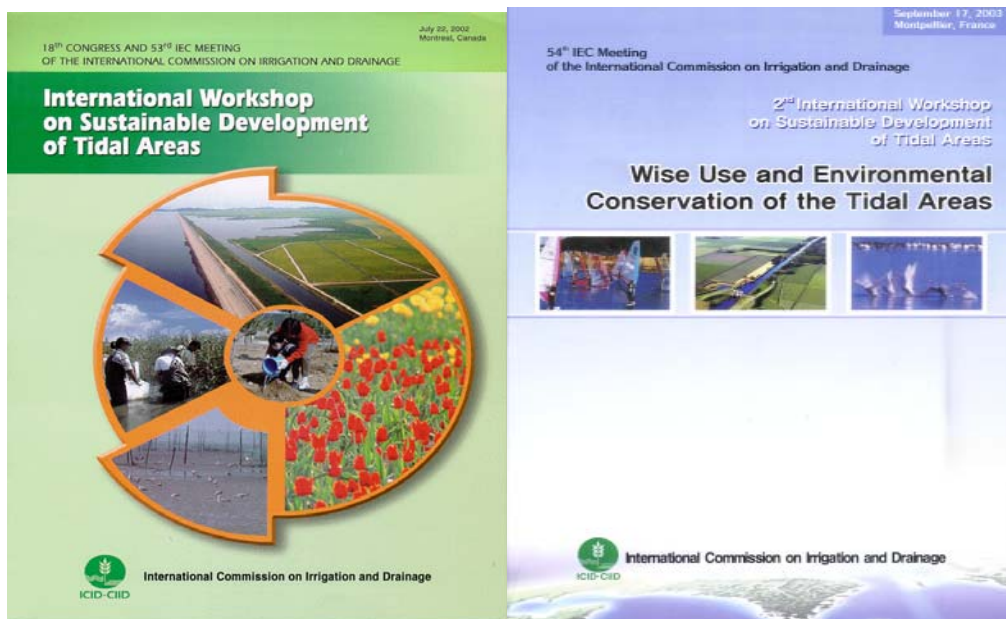




Fig. 1 Five publications from WG-SDTA

6. Number of publications with titles, under preparation by WG-SDTA

Publication of Handbook on SDTA

Since 2002, it has been prepared to publish a Handbook on Sustainable development of tidal areas to improve the planning, design and management of irrigation and drainage projects in tidal

areas. In the Handbook, all the Chapters are shared to be edited by each Chapter leaders as shown in Table 2. By October 2010, WG-SDTA finished the final draft.

There are sincere efforts from member countries for the publication of the Handbook.

A researcher, Mr. Kasay Asmerom (The Netherlands) had been appointed by HR Wallingford of the UK on an EU-Marie Curie fellowship and will assist Ir. Jonathan Simm (UK) with the preparation of the handbook beginning October 2003 for two years.

Japanese National Committee (JNC-ICID) in setting up a national Working Team to support the work of Dr. S. Taniyama/Mr. Ueda Kazumi, the Japanese representative on the Working Group. Korean National Committee has established Authors Working Teams to support the publication and Workshops on SDTA since 2002.

In several countries, among others UK, Netherlands, China and Indonesia, handbooks dealing with the tidal areas were already available. It would be referred to be included in the Handbook. The WG leaders have explored the possibilities to publish background information of the handbook to be posted on its own webpage (<http://www.wg-sdta.icidonline.org>) to project WG activities. In addition the Chairman, Dr. Park opened the WG-SDTA Webhard site (<http://www.WGSDTA>) in July 2004. It is aimed at assisting publication of the Handbook on SDTA and mutual communication between WG members.

In addition, Dr. Bart Shultz (The Netherlands) and Dr. Park (Korea) prepared the Foreword and Preface of the Handbook, respectively.

There are six chapters in the handbook, scholars and professionals from Japan, Korea, the Netherlands, Taiwan, Indonesia, Germany and India helped provide information listed as below:

Table 2 Editing plan of the Handbook on SDTA

Chapter	Description	Editor	Author
1.	Introduction	Ir. Henk Ritzema (The Netherlands) and Ir. Jonathan Simm (UK)	Cao Zhi Hong (China) V.M. Yagnik (India) Man Mohan Singh (India) Kazumi Ueda (Japan) Kim Ju Chang (Korea)
2.	Tidal Area Features and Natural Processes	Dr. Ruey-Chy Kao (Chinese Taipei) Dr. Inr. Guritno (Indonesia)	Chan-Ji Lai (Taiwan) Wen-Son Chiang (Taiwan) Hwa Chien (Taiwan) Ping Chen (Taiwan) Jiang-Ping Wang (Taiwan) Chia-Yang Tsai (Taiwan) Indreswari Guritno (Indonesia)
3.	Planning Framework for Managing Tidal Area Development	Dr. Park Sang Hyun (Korea)	Shigetaka Taniyama (Japan) Park Sang Hyun (Korea) Kim Hyung Joong (Korea) Lee Deog Bae (Korea) Kim Seong Joon (Korea) Kim Hong Sang (Korea) Masaharu Kuroda (Japan) F.G.J. de Jager (The Netherlands) J.D. Stoop (The Netherlands)

			C.J.J. Zimmerman(The Netherlands) Eisaku Shiratani (Japan) Lim Jong Wan (Korea) IM Sang Bong (Korea)
4.	Engineering for Sustainable Development of Tidal Areas	Dr. Kazuaki Hiramatsu (Japan)	Kiichiro Tanaka (Japan) Shiomi Shikasho (Japan) Manabu Shimaya (Japan) G. P. van de Ven (The Netherlands) Ken Mori (Japan) Manabu Shimaya Lee, Haeng-Woo (Korea) Jacobus Hofstede (Germany) Shiomi Shikasho (Japan)
5.	Tidal Reclamations and Their Impacts on Natural Processes	Dr. Jo Jin Hoon (Korea), B. Probst (Germany)	Reinhard Dieckmann (Germany) Thomas Tischler (Germany) Atsushi Marui (Japan) Yoshisuke Nakano (Japan) Tamotsu Funakoshi (Japan) Tomokazu Haraguch (Japan) Koji Inosako (Japan) T. Akae (Japan) H. Nukumizu (Japan) K. Nagahori (Japan) Lee, Deog-Bae (Korea)
6.	Towards an Integrated Decision Support Framework	Ir. Jonathan Simm (UK) and Ir. Henk Ritzema	Nil

Each country members have prepared to include the following case studies in the Handbook. Some of the study was already presented during previous Workshops.

- China – coastal reclamation in North Jiangsu province and Qiantong Jiang reclamation in river mouth in Zhejaing province;
- Germany – land reclamation in Meldorf Bight;
- Great Britain – managed realignment projects;
- Japan – Kameda polder, Ariake Bay and Hachirogata;
- Korea – Overview of Saemangeum project;
- Malaysia – Muda Irrigation Scheme; and
- The Netherlands – Delta project, etc.

Table 3 Reviewers: The Chapters were being reviewed by professionals as listed below:

Chapters	Reviewers
Chapter 1: Introduction	Mr. Kim Ju Chang (Korea) Editor of previous WS Proceedings

Chapter 2(3): Planning Framework for Managing Tidal Area Development	Dr. S.Taniyama (Japan), Vice President Honoraire of ICID Dr. Hsiao-Wen Wang (Taiwan), Observer of WG SDTA
Chapter 3(2): Tidal Area Features and Natural Processes	Dr. Willem F. Vlotman (Australia), Vice President of ICID Dr. Indreswari Guritno (Indonesia), WG Member on SDTA
Chapter 4: Engineering for Sustainable Development of Tidal Areas	Dr. Bart Shultz (The Netherlands), President Honoraire of ICID Dr. Park S. H. (Korea), Editor of Chapter 2
Chapter 5: Tidal Reclamations and Their Impacts on Natural Processes	Mr. Ueda K. (Japan), WG Member on SDTA Ir. H. Ritzema (the NL) Editor of Chapter 1, 6
Chapter 6: Towards an Integrated Decision Support Framework	Dr. Hiramatsu (Japan), Editor of Chapter 4 Dr. Vijay K. Labhsetwar (ICID), Director of ICID Central Office

7. Timely achievements of targets set out by WG-SDTA in its rolling plans

There have been two main duties to be carried out by WG-SDTA. First one is Publication of Hand Book on SDTA until 2007 and organization of International Workshop on SDTA to share the valuable experience between industrialized countries, developing countries and international organizations on SDTA. The duties have been scheduled to be fulfilled from 2003 to 2007 as shown in Table 4.

Table 4 Five-Year Rolling Plan of WG-SDTA

Activity	2003	2004	2005	2006	2007
Publication of Hand Book					
• Preparation of outline of publication Guidelines	✓				
• Assigning Authors	✓	✓			
• Study and Writing		✓	✓		
• Publishing electronic versions of background information, case studies and draft chapters on WG-website		✓	✓	✓	✓
• Compile and revise presented material	✓			✓	
• Publication of the Handbook					✓
• Dissemination of the Handbook					✓
Workshop					
• Writing and review of contributions by authors	✓				
• Hold the workshops during ICID meetings	✓	✓	✓		
• Prepare workshop results for inclusion in guidelines	✓	✓			
• Post on ICID Website for review and feedback	✓		✓		

8. Attendance of members at meetings and their contribution to activities of the IEC Workbody

- Dr. Park Sang Hyun (Chairman) had been an active member of WG on Irrigation and Drainage Performance (WG-PERF) from 1994 to 2001. He had joined to publish the Guidelines on Irrigation and Drainage Performance Assessment prepared by WG-PERF. His paper on Performance assessment for optimal water management in a tidal reclaimed area is included in the Guideline finished in 2002. He also gave a presentation of Case Study on Performance Assessment for the optimal water management in the tidal reclaimed area during WG-PERF meeting in Montreal 2002.
- Dr. Park has been a member in Committee on Congress/Conference(C-CONGR) since Cape Town Conference in 2000. In Cape town meeting, he, as Secretary General of Korean National Committee, had introduced the preparation of ICID Seoul meeting which held in 2001.
- Ir. Henk Ritzema, Secretary of WG-SDTA, had key roll to organize the 9th international Drainage Workshop, held in Utrecht, The Netherlands, on 10-13 September 2003.

9. Workshops organized by WG-SDTA at ICID Congress

WG-SDTA has organized International Workshops on “Sustainable Development of Tidal Areas” from Montreal ICID Congress in 2002 to New Delhi Conference in 2009.

The objective of the previous Workshops were to bring together the experts, professionals and practitioners in the field of coastal engineering, production system, , environmental conservation, community participation and socio-economic impacts for the sustainable development of tidal areas.

Workshop in Year 2002 – Montreal, Canada

An International Workshop on Sustainable Development for Tidal Areas was held on 22 July 2002 during the 18th International Congress of ICID at Montreal, Canada. The workshop was jointly organised by the WG-SDTA and the Korean National Committee on Irrigation and Drainage (KCID) and the Canadian National Committee of ICID (CANCID).

The following issues were discussed during the workshop:

- Integrated approaches for sustainable agricultural and aquacultural development.
- Planning and design of estuary dikes and reservoirs.
- Integration of irrigation, drainage and flood management in reclaimed areas.
- Historic aspects of tidal development and conservation in the world.

Fourteen papers with contributions from Britain, Japan, Korea and The Netherlands were submitted, of which following 8 papers were presented during the workshop in Montreal:

1. Sustainable Development of Tidal Areas: A UK Perspective on the Engineering Challenges, Socio-Economic Pressures and Environmental Constraints by Jonathan D. Simm (UK).
2. Impoldering Works (Kantaku) in Japan by Ueda Kazumi (Japan).
3. Hydraulic Structures in Relation to Flood Protection in The Netherlands by Folkert de Jager (The Netherlands).
4. Behavior of Water Quality in the Boryeong Freshwater Lake by Sun Joo Kim (Korea, Rep. of).
5. Water Management Objectives and their Realization in Tidal Lowland Areas in Bangladesh and Indonesia by Bart Schultz (The Netherlands).
6. Water Management: The Key for the Agricultural Development of the Lowland Peat Swamps of Borneo by Henk Ritzema (The Netherlands).
7. History of Tideland Reclamation and Development of Reclamation Technology in Korea by Park, Sang-Hyun (Korea, Rep. of).

8. Historical Development and Present Management of the Niigata Lowland Plain, Japan by Masayoshi Satoh (Japan).

A brief report of the discussions held during the workshop is listed below:

Tidal barriers and barrages have been constructed for the development of water and land resources and flood management from ancient periods in the world. It has additionally contributed to improvement of traffic condition, amenity use for health and recreation, Paddy rice fields in the tidal areas have been recognized as valuable wet lands for the habitats of wild flora, fauna and especially for migratory birds. However, fertilizer and insecticide abuse results in poor water qualities in the area. Recently, international airports have been constructed in the tidal areas of Osaka, Hong Kong, Amsterdam and Seoul. In the developed nations, major land reclamations are not positively contemplated due to environmental issues and other reasons, but are definitely interested in appropriate management of tidal area. In developing nations, however, who can not afford to contemplate major land reclamation, they may be interested in using and possibly protecting vulnerable low lying land for agricultural or industrial use. Seawater intrusion and quality of wastewater should be managed not only for human welfare, but also for environmental protection in these areas.

Workshop in Year 2003 – Montpellier, France

An International Workshop on SDTA was held on 17 September 2003 from 14.30-17.30 hours during the 54th IEC meeting at Montpellier. The workshop was titled “Wise Use and Environmental Conservation of the Tidal Areas”. It was organized in cooperation with Korean National Committee of ICID (KCID) who had published WS Proceedings and the French National Committee of ICID (AFEID) who provided equipment and facilities, etc. The workshop was attended by 28 participants. The following issues were addressed during the workshop:

- Operation and maintenance issues in reclaimed area.
- Physical and biotic characteristics in the tidal areas.
- Water quality characteristics of tidal swamps, estuaries and reclaimed areas
- Case studies on environmental conservation and sustainable development of tidal areas.

Dr. S. Taniyama, Vice-president of ICID gave an invited speech on “Sustainable Development for Tidal Areas: The Case Study of Japan”. Ir. Jonathan Simm (UK) and Ir. Henk P. Ritzema (The Netherlands) gave keynote speeches on the outline of the Handbook on SDTA. The following papers were presented:

Table 5 Papers presented in Montpellier Workshop 2003

No.	Title	Presenter
1.	Land Drying Practice and its Effects on Soil Properties in Reclaimed Lands	Akae, T., H. Nukumizu and K. Nagahori (Japan)
2.	Low Dissolved Oxygen Environment in Tidal River Affected by Inner Bay and Riverbed	Kondo, M. (Japan)
3.	Tidal Changes of Gyeonggi-bay after Large Reclamations in Incheon-bay Area	J. H. Jo and Y. D. Kim (Korea)
4.	Soil Characteristics Improvement and Salinity Control at the Newly Reclaimed Land in Japan	Marui, A., Y. Nakano, T. Funakoshi, T. Haraguchi and K. Inosako (Japan)

The following papers were not presented but included in the proceedings.

- ◆ The scientific operation of a regulator in a coastal wetland for controlling salinity intrusion for rice cultivation: A case study from South-West Coast of India by James, E.J. (India).
- ◆ Short-term Prediction of Water-Stage Time Series in a Tidal River using a State Space Predictor by Hiramatsu, K. and S. Shikasho (Japan); Park Sang Hyun (Korea); Uom Myung Chul (Korea).
- ◆ Installation of Settling Basin for the water quality improvement in Saemangeum Freshwater Lake by Lee Kwang Ya and Hong Dae Byuk (Korea).
- ◆ Management of river basins in relation to coastal wetlands: Case Studies from India by James, E.J. (India).
- ◆ Land Reclamation under Kalpasar Project: A step towards Sustainable Development by Yagnik, V.M. and Man Mohan Singh (India).

Workshop in Year 2004 – Moscow, Russia

An International Workshop on SDTA is scheduled to be held on 6 September 2004 during the 55th IEC meeting in Moscow. The workshop was given the title: “Socio-Economic Management and Stakeholder Participation for Agriculture in Tidal Areas.” It was organized in cooperation with Korean National Committee (KCID) for the publication of WS Proceedings, Russian National Committee of ICID (RuCID) for the provision of equipment and facilities, etc. The following issues were addressed during the workshop:

- Management and institutional aspects and production systems in reclaimed area:
- Community participation in the conservation of agricultural land:
- Socio-economic impacts and cost/benefit analysis of various development alternatives:

At the workshop, Ir. Jonathan Simm (Great Britain) gave keynote speech on “UK practice and experience in sustainable development of tidal areas.” Mr. Ueda Kazumi (Japan) gave keynote report on activities of the Japanese team for the publication of the ICID handbook. Mr. Ahn, Jong-wun (President of KCID) gave invited speech on ‘Sustainable development of tideland and stakeholder participation.’ Besides this, 5 papers were presented:

- Mr. Bernt Probst (Germany): “Information and participation in coastal defence in Germany”
 - Prof. Sun-Joo Kim (Korea): “Operation of freshwater lake water quality management system considering land use of basin”
 - Dr. Sang-Hyun Park (Korea): “Stakeholder participation to restore flood damages after typhoon”
 - Mr. Ueda Kazumi for Yoshimitsu Tanaguchi (Japan): “Community participation for the creation of sustainable agriculture in reclaimed land.”
 - Ir. Jonathan Simm (Great Britain): “The UK Foresight Flood and Coastal Defence project.”
- Mr. S.Taniyama, Vice-president of ICID will provide concluding remarks.

In the Workshop, it was recommended that various case study results would be presented in the next Workshop in Beijing. Environmental changes and mitigation schemes in Isahaya tidal project in Japan, and in Saemankeum tidal project in Korea and some advanced technologies or related experiences on sustainable development of the project in the western countries would be valuable themes in the Workshop. Study of the multi-function of paddy rice fields in tidal swamps and estuaries would be valuable to the member from monsoon regions.

Although most of the study items have been already covered in the previous three workshops since 2002, it was agreed that it was necessary to have a final fourth workshop to discuss the draft handbook and to provide an integrating overview.

The fourth Workshop on SDTA is scheduled to be held in September 13 2005 during Beijing Congress. The title for the workshop is: “Evaluation of draft ICID guidance handbook on SDTA”

The published material for the fourth Workshop would comprise of the draft handbook including main chapters and case studies. Main chapter leaders and some authors of case studies would

be invited to make presentations to introduce and explain the material they have prepared for the handbook.

Workshop in Year 2005 – Beijing, China

The Working Group held its workshop on “Evaluation of Draft ICID Handbook on SDTA” in two sessions on 13 September 2005 between 09.00-12.30 hours and 13.30-17.00 hours. The round table discussion would be in addition to the (½ day) meeting of the WG in Beijing. Hence a total of 1½ days has been planned for various activities of the WG during the Beijing (2005) meeting. The following items were presented:

- Flooded Water in West Sea Barrage N. Korea
- Tidal Lowland Features
- Tsunami Aceh
- Tidal Lowland Development In Indonesia
- The Multi-Functional Roles of Paddy Irrigation in Tidal Areas

Workshop in Year 2006 - Kuala Lumpur, Malaysia

The programme for the 5th ICID Workshop on Sustainable Development of Tidal Areas to be held on Friday 15th September 2006 at Kuala Lumpur, Malaysia was discussed and approved:

- Chapter 2 Aspects of Managing Development of Tidal Areas, Park Sang Hyun
- Chapter 2.3 Conservation (habitat/biodiversity): Lee Deog-Bae
- Chapter 2.5 Multi-functional Roles of Tidal Reclaimed Areas: S. Taniyama
- Chapter 2.7 Water Quality Management Planning: Joong-Dae Choi, E. Shiratani, et al.
- Case Study: Water Quality Management of Freshwater Lake: Sun Joo KIM: Phil Shik KIM
 - Chapter 2.9 Economic Issues: Kim Hong Sang
 - Chapter 3 Tidal and Lowland Feature, Indr. Guritno, A. Ghazalli
- Case Study: The Muda Irrigation Scheme in Malaysia
 - Saemangeum Seadike: recent developments: Mr. Lee Bong hoon, Eo, Daesu
 - Chapter 6 Tidal Reclamation and Their Impact on Natural process: Bernd Probst
 - Working Group SDTA: The way forward: Henk Ritzema

Workshop in Year 2007 - Sacramento, USA

The Workshop on SDTA at Sacramento, USA, Chairman confirmed the Workshop plan on SDTA to be held on 4th October 2007 and the topics of the papers as follows:

- An ICID Position Paper on Development of Tidal Area: Some Principles and Issues towards Sustainability members of WG-SDTA
- Aspect of Managing Development of Tidal Areas – Dr. Park Sang Hyun(Korea, Rep. of);
- Engineering for Sustainable Development of Tidal Areas- Dr. Kazuaki Hiramatsu (Japan)
- Catchment Water Quality Management Planning-Dr. Joong-Dae Choi (Korea, Rep. of);,
- Case study: Estimating supplement water in Yeong-San reclamation District- *Wook-Jong Ju, young Su Kim* (Korea, Rep. of);,
- Case study: Amenity Use of Sea dike space in Saemangeum Tidal reclamation Project- Mr. *Lee Bong-Hoon* (Korea, Rep. of);
- Sustainable Development of Saemangeum Project- Dr. Na, J.W, Dr. Lee YONG Jig
- Model study on coastal process in Taiwan-Dr. Ruy-Chy Kao (Chinese Taipei)

Workshop in Year 2008 - Taipei, Taiwan

The business of the meeting in Lahore, Pakistan could not take place in view of scarce attendance of members, so WG-SDTA held an Interim Meeting and workshop in Taipei, Taiwan in February 2009. Four papers were presented as following:

- Henk Ritzema (The Netherlands): Handbook chapter 1 Introduction & chapter 7 Integrated decision support framework
- Park Sang Hyun (Korea): Handbook chapter 2 Aspects of managing development of tidal areas

- Ruey-Chy Kao (Taiwan): Handbook chapter 3 Tidal area features and natural process
- Jo Jin-Hoon (Korea): Water Quality Improvement Measures in Saemangeum Lake

Workshop in Year 2009 - New Delhi, India

WG's Internal Workshop on "Monitoring Systems for Sustainable Development of Tidal Areas". ICID Central Office had requested Dr. Park to organize a special workshop on SDTA during the 60th IEC Meeting in December 2009 at New Delhi, India. In the Taipei Meeting (February 2009), the WG members agreed to this request and accordingly organized a workshop on the theme "*Monitoring system for the sustainable development of Tidal areas*" in the afternoon of 08 December 2009 at New Delhi, India. Five Papers were presented in the workshop:

- Application of Detention Wetland in Coastal Areas in Taiwan, by P. H. Kuo and Dr. H. W. Wang (Chinese Taipei)
- Stream Monitoring for Water Quality Management: An Example of Upstream Monitoring in Sloping Alpine fields by Prof. J. D. Choi et al. (Korea)
- Ensuring Inflow Water Quality for the Fresh Water Reservoir of the Gulf Of Khambhat Development Project by *Dr. M.S. Patel et al. (India)*
- Monitoring of Migratory Birds in Tidal Areas by Dr. Park Sang Hyun and Lee Deog Bae (Korea)
- Environmental Monitoring in Saemangeum Lake by Dr. Park Kwang Soo (Korea)

At the onset, Dr. Bart Schultz gave an encouraging speech in the Workshop. Mr. Dhimant B. Vyas (India) then made a presentation and introduced the Kalpasar Project from Gujarat state in India.

Workshop in Year 2010 –Yogyakarta, Indonesia

WG-SDTA held their working group meeting on 13 October 2010: 13:30-17:00 hours, incorporated with IEC meeting taking place in Yogyakarta, Indonesia. Members of WG-SDTA discussed about the result of the handbook and confirm the final draft. The international meeting had gathered representatives and observers from Korea, Japan, the Netherlands, Taiwan, Indonesia, China, Germany and UK to attend, and settled the handbook as Chapter 1: Introduction; Chapter 2: Tidal Area Features and Natural Processes; Chapter 3: Planning Framework for Managing Tidal Area Development; Chapter 4: Engineering for Sustainable Development of Tidal Areas; Chapter 5: Tidal Reclamations and Their Impacts on Natural Processes; and Chapter 6: Towards an Integrated Decision Support Framework.

10. Workbody contributions to new initiatives of ICID

- 1) Concerned on Tsunami invasion in December 2004, WG-SDTA uploaded valuable information of the contribution of Seawall in the WG website to be discussed during Beijing Workshop.
- 2) In the Eighth Meeting of the WG-SDTA held at 08 December 2009 in New Delhi, India. Prof. Ruey-Chy Kao (Taiwan) bring up the idea about using renewable energy such as ocean energy to generate green power, hoping that by which measure we can slow down the climate change.

11. Participation/contribution of WG members in other International Programs

- Ir. Jonathan Simm gave a presentation titled "A Comparison of Approaches to Sustainable Development of Tidal Areas in UK and Korea" in an International Seminar in UK in October 2003 in co-operation with Chairman of WG-SDTA. He is a co-author of "Beach management manual" published by CIRIA in 1996 as shown in Fig. 2 and contributed to publish "Shoreline management plans – a guide for coastal defence authorities" by Defra in London 2001.
- Ir. Henk Ritzema contributed to publish a guidelines with distinguished ICID members, as co-authors, titled "Subsurface Drainage Practices- Guidelines for the implementation, operation and maintenance of subsurface pipe drainage systems" published by ALTERA, the Netherlands in 2005 as shown in Fig. 2.

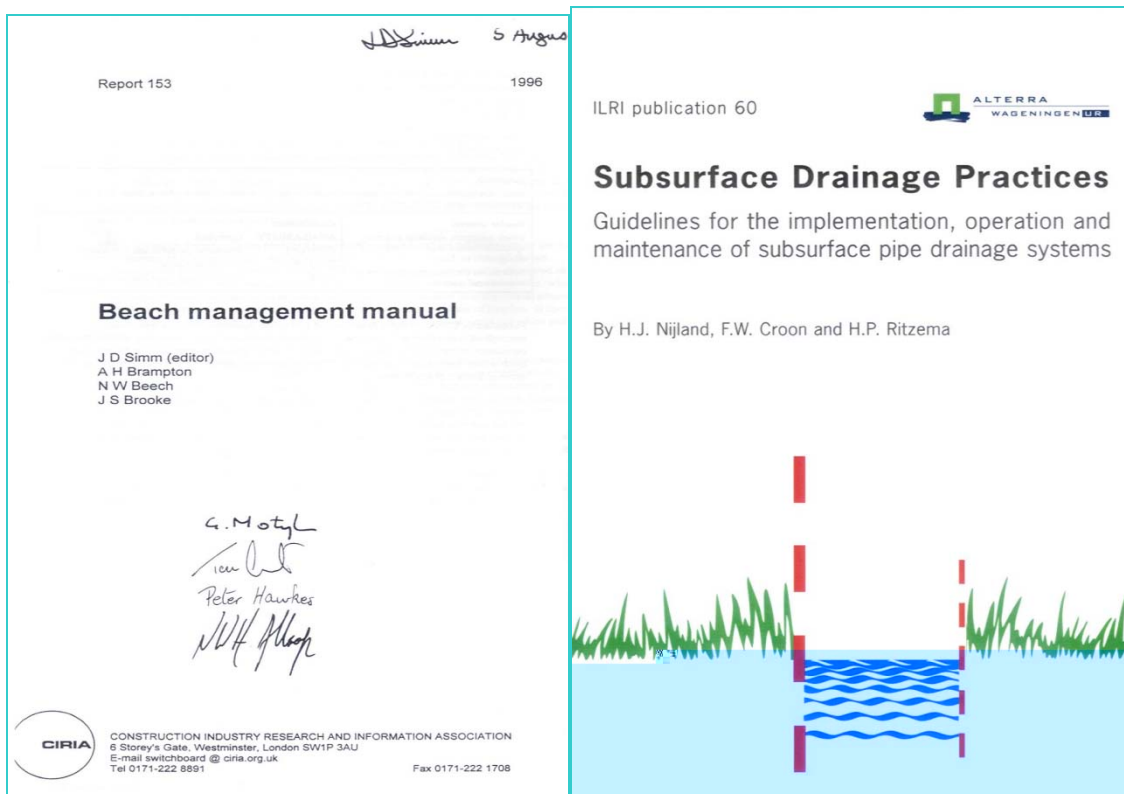


Fig. 2 Publications contributed by WG-members (J. D. Simm, H. P. Ritzema)

- James E. is a co- author of the guideline "The Vembanad-Kol wetland system and river basin management in Wetlands and Integrated River Basin Management, Experiences from Asia and Pacific, UNEP- Wetlands International-Asia-Pacific, Kuala Lumpur in 1997.
- Dr. Park(Chairman) gave presentations in the first and second International Seminars on Tidal Reclamation organized by The Society of Agricultural Research on Reclaimed Lands held in Korea, The title in 2002 was "Modernization of future hydraulic structure in Tidal reclaimed area" and in 2003 was "Stakeholder participation to restore flood damages in Lowland after Typhoon".

Dr. Park also contributed to publish "Rice Culture in Asia" published by ICID and Korean National Committee in 2001 and He wrote the subchapter 7.6 "Tide reclamation" in the publication. He is a member of Organizing Committee to hold International Seminar prepared by International Network for Water and Echo-system in Paddy Field (INWEPF) in cooperation with Korean National Committee of ICID and Japanese National Committee of ICID. Dr. Taniyama (Supporter of WG-SDTA, Japan) is a key member of INWEPF. The seminar was held in November 2005 in Seoul and the results have been included in the Handbook on SDTA.

- Cooperation with Ramsar

A Joint Workshop was held during 29-30 October 2008 at Changwon City in Korea, during 10th meeting of Ramsar Conference in Korea. WG-SDTA organized Session 1 in the International Workshop on Sustainable Paddy Farming and Wetland. The following papers were presented:

Theme: Tidal wetland and global warming

1. Ir. Henk Ritzema (The Netherlands), Coastal lowland development: coping with climate change

2. Prof. Ruey-Chy Kao (Taiwan), Quantitative analysis of Multifunctionality benefit of paddy field and case study
3. Dr. Hajime Tanji (Japan), Situation and problems of tidal wetland in Japan in view of global warming
4. Prof. Chun G. Yoon (Korea), Wise use of human-made wetlands to partially compensate for the loss of natural wetlands

Summary of the workshop:

1. Participants in the Workshop: 150 persons
 - Korea 140 persons,
 - Foreign 10 persons from Japan, Korea, Laos, Sri Lanka, Taiwan, Thailand, the Netherlands, and 2 International Organizations (IWMI, Mekong River Committee)
2. Organization committee
 - Korea Commission on Irrigation and Drainage (KCID, hosted organizer)
 - Korea Rural Community Corporation
 - International Network for Water and Ecosystem in Paddy Field (INWEPF)
 - Supported by Ministry of Food, Agriculture, Forestry and Fisheries
3. Fast facts indicating the relation between Ramsar and the workshop:
 - The 10th meeting of Ramsar Conference was organized focusing on conservation of the wetland to keep waterfowls.
 - In the Ramsar meeting, KCID and Korea Rural Community Corporation organized the Workshop to discuss with NGO group the importance of the paddy field, including the sustainable development in tidal areas.
 - WG-SDTA prepared the 1st Session of the Workshop and Chair of WG, Dr. Park Sang Hyun chaired the session and Dr. Henk Ritzema, Vice chair of WG, gave a presentation concerned on sustainable development of tidal low land in the era of the climate change, as well as Dr. Ruey Chy Kao, Secretary of WG, concerned on Evaluation of the multi-functional role of the Paddy field, Dr. Lee Deok-Bae, SDTA Work team member in KCID, concerned on evaluation of the institutional and environmental assessment system for the biodiversity management in Korea, respectively.
 - A lot of environmentalist from NGO group joined the Workshop and agreed sustainable development of the wetland, including tidal areas, to increase productivity, keep sound environment and contribute disaster in Global Warming Era.



12. Papers submitted by WG members to ICID Conferences/ICID Journal/other Journals

- Dr. Park (Chairman) submitted a paper titled “Improvement of Water management in the paddy rice field after unification of water sectors” in ICID 2002 Congress in Montreal. The paper was given a presentation in Congress Question 51.2. He also submitted a paper in the Journal of Korean Committee on ICID, titled” Possibility of the Byeokgolje dam to be constructed as a dike in the tidal area” in June 2003.
- Position paper on “Sustainable Development of Tidal Areas”
 Dr. Park, Mr. Simm and Dr. Ritzema prepared a position paper on “Development of tidal areas: some principles and issues toward sustainability” which was submitted and accepted for publication in the Special Issue of the International Journal on Irrigation and Drainage on occasion of the 5th WWF at Istanbul, Turkey (Ref.: Park, S. H., Simm, J., and Ritzema, H. P., 2009. “Development of tidal areas: some principles and issues toward sustainability”.Irrigation and Drainage, 58: S52–S59, DOI: 10.1002/ird.474.). The French National Committee (AFEID) has provided (02 Oct. 2009) the French translation of the Abstract of the position paper.

13. Website of WG-SDTA and services offered through it

The Chairman, Dr. Park opened the WG-SDTA Webhard site (<http://www.WGSDTA>, ID: WGSDTA, p/w: 12345) to be aimed at assisting publication of the Handbook on SDTA and mutual communication for the preparation of International Workshops on SDTA between WG members. The Webhard site is composed as follows:

- * Board
- * Mail box
- *Address book

- * Guest holder
- *10 SDTA HANDBOOK
- *ICID
 - Agenda and Minutes
 - Cooperation Organization
 - PAPER-REFERANCE
 - Special Issue
 - WORKSHOP PROCEEDINGS (02-09)

14. Conclusion

WG-SDTA have given sincere efforts not only to improve irrigation and drainage problem in the farm land and flood improve problems in the agricultural area but also to expand ICID activities from farmland area to the tidal reclamation areas.

The Working Group members have devoted to publish Handbook on SDTA and organize International Workshops for 7 sequential years from 2002 to 2009, supported by a lot of ICID national committees and ICID leaders. The WG have contributed to provide valuable chances to exchange knowledge and experience among WG members from developed countries who have advanced technology and developing countries who need it.

WG-SDTA is in good harmony with International Organizations, such as Global Environmental Centre (GEC) who provided "Guideline on Integrating Wetland Conservation" supported by Ramsar, the Society of Agricultural Research on Reclaimed Lands and International Network for Water and Echo-system in Paddy Field (INWEPF) to exchange valuable information and to find distinguished authors and contributors to publish the Handbook and organize Workshop on SDTA.

In the future, we must face the extreme climate caused by global climate change and deal with it. WG-SDTA will continue to encourage coastal countries to share related technologies, experiences and knowledge to protect tidal area whilst preventing disaster, during second phase of the WG period, in the era of the climate change and make contribution to the world.