

**MINUTES OF THE VIRTUAL 3RD MEETING OF THE
WORKING GROUP ON SUSTAINABLE DEVELOPMENT OF TIDAL AREAS (WG-SDTA)**

26 October 2020, 13:30 hours (IST)

Strategy Theme: Knowledge

Presented by the Chairman

Year of Establishment: 2017

Extended the completion of the Mandate: 2023

Mandate : (a) To understand the existing and potential challenges and opportunities of tidal areas for now and the future by figuring out underlying issues; (b) To raise awareness of the increasing risk on tidal areas due to global climate change and stimulate interdisciplinary discussions on impacts, mitigation, and adaptation; (c) 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; (d) To identify sustainable development and management options in tidal areas, and find a balance between the conservation and development of tidal areas with acknowledgement of ecosystem services; and (e) To join the international dialogues and organize international conferences and short courses to promote interdisciplinary and participatory land and water planning and management in tidal areas; and (f) To collaborate with other related working groups actively, and to exchange relevant experiences amongst NCs and support for developing, and least developed countries.

Members Present: (1) Dr. Ruey-Chy Kao, Chairman (Chinese Taipei Committee); (2) Ir. Henk P. Ritzema, Vice-Chairman (The Netherlands); (3) Dr. Nor Hisham M. Ghazali (Malaysia), Secretary; (4) Prof. Budi Sasntoso Wignyosukarto (Indonesia); (5) Prof. Zhang Zhanyu (China); (6) Mr. Anuj Kanwal (India); (7) Dr. Ikuo Yoshinaga (Japan); (8) Mr. Paavan Kumar Reddy (India), Young Professional (India); (9) Dr. Vijay K. Labhsetwar (India); (10) Secretary General, ICID represented by Er. B.A. Chivate, Director (Technical), ICID Central Office.

Observers: (i) Mr. Ismayatim Hamdan (Malaysia); and (ii) Ms. Elena (CTC), Secretary of Chairman.

Website: http://icid-ciid.org/inner_page/109

WG-SDTA Minutes Item 1: Action Taken Report by Chair

1. The WG Chair Dr. Ruey-Chy Kao (Chinese Taipei Committee) welcomed all the members and presented a report on the actions taken on the decisions held at its last meeting at Bali, Indonesia in September 2019.
2. As for the WebEx meetings, Webinars and e-Discussions, the Chair will prepare a schedule to discuss with the members through email. The group recommended discontinuation of Eng. Elaraby Mohamed Gomas Elkashawy and Prof. Dr. Hossam Refaat from Egypt for the membership of the WG as they have not contributed to the activities of the group for more than two year. WG Chair Dr. Ruey-Chy Kao requested Egyptian National Committee of ICID (ENCID) to nominate new professionals/experts for the membership of the WG. Membership status is given in **Annex 3 (page 43)**.

WG-SDTA Minutes Item 1.1: Selection of the Vice-Chairman of the WG

3. WG Chair elected Ir. Hj. Nor Hisham Bin Mohd Ghazali (Malaysia), Ex-Secretary of the WG as new Vice-Chairman and Dr. Ikuo Yoshinaga (Japan) as new Secretary because Ir. Henk Rizema (The Netherlands), Ex-Vice-Chairman, had stepped down. The Chair thanks Ir. Henk Rizema for his contribution to WG-SDTA with a hope that he will pay his attention to the activities of group.

WG-SDTA Minutes Item 1.2: A brief report of Online/WebEx Meeting of the Group, 30 June 2020

4. A brief report of the WebEx / Online meeting held on 30 June 2020 was announced by the Chair as annex 2 in the WG Agenda. Moreover, Dr. Joengreol Jang (Korea) was failed to join the meeting due to the problem of log-in during the virtual meeting of the group.

WG-SDTA Minutes Item 2: ICID Action Plan 2030: Activities on Sustainable Development of Tidal Areas

5. During the Virtual meeting, the WG reviewed the Action Plan (Road Map to ICID Vision 2030) based on the new mandate by updating the activities on sustainable development of tidal area issues and provided latest updates about the fresh action plan for 2018-2023 (refer **Annex 1**). However, schedule of the present tenure (2017-2023) of the WG which could be changed by the emerging situation of the COVID-19 based on the Notification No. 1 of 2018 dated 03 January 2018 regarding establishment of WG-SDTA by ICID Central Office.

WG-SDTA Minutes Item 3: Upcoming WG Events**WG-SDTA Minutes Item 3.1: International Workshop on ‘Integrated Solution for Irrigation and Drainage Tails and Land Subsidence in Tidal Areas’ in 2022 at Australia**

6. The WebEx / Online meeting held in June 2020, the WG agreed to organize an International Workshop titled “Integrated Solution for Irrigation and Drainage Tails and Land Subsidence in Tidal Areas” during 73rd IEC and 24th ICID Congress to be held in 2022 at Australia. WG Chair confirmed again the holding period of the workshop.

WG-SDTA Minutes Item 3.2: Short Course titled ‘Tidal Prediction and Land Subsidence Prevention and Reclamation’ in 2021

7. The WG decided to organize a Short Course titled ‘Tidal Prediction and Land subsidence prevention and reclamation’. Since the course requires the application of numerical model software for participants to practice, it cannot be held through e-discussion. Therefore, depending on the COVID-19 epidemic situation, the courses will be held of practical and e-discussion parts in National Cheng Kung University, Tainan, Taiwan in 2021 & 2022, respectively. WG Chair makes preparation for the short course through e-discussion with WG members.

WG-SDTA Minutes Item 3.3: Side Event of the Working Group on SDTA in 2021

8. The WG decided to defer a Side Event on ‘Global challenges of land subsidence in tidal areas and the integrated solutions (tentative)’. It was noted that Chair Dr. Ruey-Chy; Dr. Vice-Chairman Nor Hisham M. Ghazali; and Secretary Dr. Ikuo Yoshinaga would take this responsibility and make preparation for the Side Event.

WG-SDTA Minutes Item 3.4: Web-based seminars and e-Discussions

9. The WG had decided to organize a web-based seminar on ‘Drainage Capacity and Flood Disaster in Tidal Areas under a Variable and Changing Climate’ and e-Discussion on ‘Integration of Drainage tail, Land subsidence, Groundwater and management in Tidal Areas’ in 2020. The e-Discussions would be possible to schedule in near future. However, web-based seminars have not been held yet for hardware and jet-lag problems, so that they will be discussed with WG members.

WG-SDTA Minutes Item 4: Ground Water and the Land Subsidence on the Coastal Areas

10. During the last meeting, the WG discussed the issue related with ‘Ground water and the land subsidence on the coastal areas’ and agreed to pursue groundwater and land subsidence issues. In this regard, ICID Central Office requested WG Chair to take further course of actions under this item. WG will hold a short course titled ‘Tidal Prediction and Land Subsidence Prevention and a Reclamation’ to deepen and share the understanding of these matter.

WG-SDTA Minutes Item 5: Updating Multilingual Technical Dictionary (MTD)

11. Dr. Ikuo Yoshinaga (Japan), as nodal person of MTD, in consultation with the WG Chair as well as other members of the group, will be responsible for reviewing and updating MTD.

WG-SDTA Minutes Item 6: A format for the 2-page ‘Country Note’ – Sustainable Development of Tidal Areas

12. During the Virtual meeting, it was noted that the WG members would provide 2-page country papers with tables comparing different factors. The format prepared previously included a few difficult questionnaires so that WG Chair announced that the format would be revised partly. Ir. Henk Rizema has provided the country note of The Netherlands as **Annex 2**. WG Chair thanks Ir. Henk Rizema for his contributions.

WG-SDTA Minutes Item 7: Any other business

13. Meeting concluded with Vote of Thanks to Chair and all members and participants.



Annex 1 [Item 1]

ROAD MAP TO ICID VISION 2030 – ACTIVITIES OF WG-SDTA (revised July, 2020)

	Activity	Outcomes/ Outputs	Milestone for Year 2017	Milestone for Year 2018	Milestone for Year 2019	Milestone for Year 2020	Milestone for Year 2021	Milestone for Year 2022	Milestone for Year 2023
Goal B: Be a catalyst for change in policies and practices									
Strategy B1 : Supporting Development of Appropriate Policies	1.1 Promoting Sophisticated water-saving irrigation development with IOT and water-saving irrigation model techniques exchanges	Technical report, workshop proceedings and water industry web site	Preparing: Promoting demonstrati ve plan	Site tests demons- tration: Hardware const- ruction and software tests	Site tests demons- tration: Hardware, software and system control integrating process	Site tests plan: Workshop observation	Exami- nation Plan results & improve- ment	Exami- nation Plan results & improv- ement	Examination Plan results & Improvement ; expand to other areas
	1.2 Promoting up-to-date water-saving experience exchange	As above	As above	As above	As above	As above	As above	As above	As above
	1.10 Sustain- able drainage management experience exchange	Internet of Things Water industry workshop					Web-based seminars on SDTA	Web- based semina rs on SDTA	Internet of Things Water industry workshop
Goal C: Facilitate exchange of information, knowledge and technology									
Strategy C4 : Compile, Collate and Share Knowledge and Ex- periences	4.26 Special Issue of ICID Journal on SDTA	Special issue of IRD	Announce- ment of special issue, inviting authors etc.	Setup Review Committee for selected papers based on the workshops	Submission of final drafts	Review Papers: 2019 International workshop papers	1. Publish- ing Special Issue of IRD 2. 2021 Inter- national workshop “Integrated Solution for Irrigation and Drainage of Drainage Tails and Land Subsidence in Tidal Areas”	Review Papers: 2021 Internatio- nal workshop papers	Publishing Special Issue of IRD
Strategy C5 : Dissem- ination of Data, Informa- tion, Tools, Know- ledge & Know How	5.8 Develop and maintain the ICID web site as a knowledge hub	On-line					Develop and maintain the ICID web site as a SDTA knowledge hub	Update and maintain the ICID web site as a SDTA knowledg e hub	Update and maintain the ICID web site as a SDTA knowledge hub
Goal E: Encourage research and support development of tools to extend innovation into field practices									
Strategy E3 : Develop and Promoting Tools for AWM	3.2 The application for output of development tools from academic institutions			Prepare tidal prediction and typhoon wave model		Prepare Short Course (2021)	Prepare “Tidal Prediction and Land Subsidence Prevention and Reclama- tion”	Prepare “Numer- ical Simu- lation of estuary and draina- ge flood in Tidal areas”	Prepare “Numerical Simulation of estuary flood and coastal flow field”
Goal F: Facilitate capacity development									
Strategy F3:	3.7 workshop/Train	Technical transfer and	Scope, theme and		Short Course/Trai		Short Course /	Web- based	Short Course /

	Activity	Outcomes/ Outputs	Milestone for Year 2017	Milestone for Year 2018	Milestone for Year 2019	Milestone for Year 2020	Milestone for Year 2021	Milestone for Year 2022	Milestone for Year 2023
Technical Training of Young Professionals from Member Countries	ing Workshop on Sustainable Development of Tidal Areas	internet information short course /training workshop	announcem ent		ning Workshop on SDTA		Training Workshop on SDTA	seminars on SDTA	Training Workshop on SDTA
	3.8 To launch e-Discussion on Sustainable Development	E-discussion	E-discussion on Sustainable Development of Tidal Areas		e-Discussion on SDTA		e-Discussion on SDTA	e-Dis-cussion on SDTA	e-Dis-cussion on SDTA

(Source: Consultative Group (CG) Report: A Water Secure World Free of Poverty & Hunger: A Road Map to ICID Vision 2030)



Annex 2 [Item 6]**FORMAT FOR 'COUNTRY NOTE' (WG-SDTA)**

Title: Coping with Climate Change in A Densely Populated Delta: A Paradigm Shifts in Flood and Water Management in The Netherlands

Author: Henk Ritzema, retired Ass. Professor, Wageningen University, Wageningen, The Netherlands, email: henk.ritzema@wur.nl

Contents: Page limitation: roughly 2 pages (1500 words) + 1 page for the table

1. Introduction

The Netherlands, a low-lying country in Western Europe (50° - 54° N and 3° - 8° E), consists of deltas and former flood plains of the rivers Rhine, Meuse and Scheldt. The total territory, including inland lakes, estuaries and territorial waters, is 41,543 km², of which 55% is used for agriculture, 12% is nature, 19% is open water and the remaining 14% is built-up area.

2. Topography/soils and natural characteristics

The land area consists mainly of alluvial deposits and about 25% of the country lies below mean sea level. In the absence of dunes and dykes more than 65% of the country would be flooded at high sea and high river levels. Most of the western part has an average elevation varying between 0 and 5 m below Mean Sea Level (MSL) and has little relief except for the coastal dunes. The lowest point north of Rotterdam is some 7 m below MSL. To prevent these areas from flooding, 3,200 km of primary dykes have been built along the coast and the main rivers along with about 14,000 km of inland or secondary dykes. Drainage is needed to make these low-lying areas suitable for agriculture or other land uses.

3. Climate and rainfall

The yearly rainfall is about 887 mm and the evaporation is only 559 mm, thus there is a rainfall excess and drainage is needed. In winter, there is excess rainfall, but in summer, the growing season of most crops, there is a deficit. Thus, the critical period for drainage is early spring when rapid removal of excess water enables mechanical land preparation in order to bring forward and lengthen the growing season. In summer, however, the rainfall is not evenly distributed but falls in extreme events and drainage is needed to avoid flooding and, during periods of prolonged drought, supplemental irrigation is needed to reduce the water deficit. In the Netherlands, rainfall is predicted to increase in spring, autumn and winter, but not in summer (the main growing season). In summer, while extreme rainfall events are predicted to increase, higher temperatures will result in increased (crop) evapotranspiration and higher rainfall deficits during the growing season. A recent study over the period 1951-2009 indicates an upward trend in daily precipitation from February to April and a decreasing trend from July to September. This change in precipitation patterns is most pronounced along the coast (changes of 15 – 30%) decreasing to less than 5% 150 km further inland near the German border.

4. Sea conditions in front of the coast and river regimes

Over the last thousands of years, The Netherlands has been subject to a sea level rise of approximately 0.7-0.8 mm year⁻¹. Meanwhile, over the past 15 years the rate of global mean sea level rise has increased to 2 mm year⁻¹. For the coming decades the predicted increase due to climate change in the mean sea level for the Netherlands are much higher: from 0.65-1.3 m by the year 2100 up to 2-4 m by the year 2200. The expected rise in temperature will also result in decreasing river flows in summer and increased flows in winter. For the river Rhine, the peak discharge, based on an average annual exceedance frequency of once every 1250 years, is projected to increase from the current 16,000 m³ s⁻¹ to 18,000 m³ s⁻¹ in 2100. The combined effects of the projected increase in sea level, land subsidence and increased river discharges will significantly increase the risk of flooding and complicate water management.

5. Sustainable development and management options in tidal areas (design criteria for drainage and flood protection provisions)

Flood risk management strategies in the Netherlands have traditionally focused on reducing the probability of flooding. To protect the Netherlands against flooding, the country is divided into dyke-ring areas, i.e. areas that are protected through a closed system of dykes, dunes, dams, barriers and natural high grounds (as laid

down in the Water Act of 2009). This so-called polder approach refers to the drainage and flood protection of low-lying areas by means of pumps, canals and flood defences. The legislation set an allowable frequency (the exceedance probability) for the water level that each dyke-ring must be able to withstand. The allowable exceedance probability does take into account the possible damage of flooding and the potential numbers of victims. Compartmentalization of these dyke-ring areas is an effective method to reduce the effects of flooding. The densely populated western part of the country, where the main risks come from storm surges along the coast and thus the warning time is relatively short, has the highest level of safety (1/10.000 per year) because the possible damage is very high. In the less densely populated areas in the south-west and north-east the safety level is 1/4.000 and this safety level is further reduced to 1/1.250 for the areas around the main rivers as high discharges in these rivers can be better predicted and thus there is more time for emergency measures.

6. Risk on tidal areas due to changes in land use, land subsidence and impacts of global climate change (rainfall, river regimes, and drought)

Flood risk management strategies traditionally focused on reducing the probability of flooding by strengthening dykes and embankments. This is known as the 'technological lock-in': a vicious cycle of investment over time to protect the continuously subsiding land against flooding. The new flood protection standards are based on a different approach: instead of focusing only on prevention, the new standards take into account flood prevention as well as the risks and potential impacts of flooding, for example the individual risk of being affected by a flood. The greater the risks and/or the consequences, the higher the standard. The basic protection level is the same for all Dutch people, independent of where they live: it stipulates that the risk that an individual may die as a result of flooding should be less than 1 in 100,000 per year (10⁻⁵). This probability of 10⁻⁵ per year is lower than the risk of dying as a result of a traffic accident, but higher than the risk of dying of a so-called 'external' risk factor, e.g. the risk of dying due to contamination by chemicals or other harmful substances (which has a standard 10⁻⁶ per year).

7. Potential challenges and opportunities for development and management of tidal areas

Nowadays, instead of simply increasing the safety standards, it is considered more effective to reduce the social disruption caused by flooding. Instead of focusing only on prevention of flooding, the new standards also take the potential impacts and risks of flooding into account. This multi-layer approach is based on three pillars: (i) preventive measures to strengthening the flood protection and water management systems to protect vital and vulnerable infrastructure; (ii) spatial planning to reduce the possible impacts of flooding; (iii) disaster management to prevent social disruption caused by this flooding. Water management is also changing to a more adaptive and participatory form in which, instead of simply increasing drainage and pumping capacity further, the focus has shifted to controlled drainage with the aim to get a better control over the drain discharges and water levels than simply pump out the water. The challenge is to strive for a balance between water levels that allow optimum land use and water levels that minimise subsidence. To develop scenarios for adaptation, the Netherlands is divided into three hydro-ecological zones, based on the soil type and the elevation with respect to mean sea level (MSL): (i) the man-made polder areas with marine clay soils along the North Sea coast and the former Zuider Sea with elevation below sea level; (ii) the low-lying peat land areas in the west (also below sea level) and north; (iii) the sandy and loamy soils areas in the centre, south and east with elevations well above sea level. Each zone has its own land and water characteristics and associated land uses and, based on the predicted land use changes, future water management strategies were developed. Innovative solutions, e.g., floating roads, buildings and structures, buildings on piles, etc., are developed to reduce and counterbalance the never-ending subsidence.

8. The way forward

Although the challenges are clear, addressing them effectively will take time. In The Netherlands and other countries in Northern Europe, this process of optimization, has been going on for centuries and will continue to do so. It will only be successful here and elsewhere in the world if the principles and practices of sustainable 'wise use', especially with respect to flood protection, hydrology and water management, are taken into account.

