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ICID NEWS

MANAGING WATER FOR SUSTAINABLE AGRICULTURE

MESSAGE FROM THE PRESIDENT

Dear Colleagues,

Most concepts of irrigation design and practices are rooted in the knowledge mainly developed in the first half of the 20th century, and the basic questions of when, to what extent, and how to irrigate a particular crop are still answered using the old methodologies. We are still using atmospheric water demand analysis for assessing crop water requirements, or for irrigation scheduling and relying on the available soil moisture status rather than the crop performance itself to assess plant's water demand. Indeed, irrigation efficiency approaches validity, which has been extensively used as tools for evaluating irrigation systems' performances for decades are increasingly being questioned and their validity is rejected by many irrigation scientists.

It is incumbent on ICID to revisit such agronomic and management issues and topics related to irrigation sciences and technologies to address growing concerns on environmental issues, natural resources scarcities under the prevailing socio-economic fluxes.

Realizing these necessities ICID conceptualized a renewed International Research Program on Irrigation and Drainage (IRPID) through a network of institutions that addresses the research and technology needs of National Committees (NCs) within their respective countries. IRPID is essentially an effort to fill the gap created by the closure of the International Programme for Technology and Research in Irrigation and Drainage (IPTRID) which was supported by World Bank and FAO and was active till 2008.

IRPID's mission is to enhance research activities in irrigation and drainage science, technology, and management aspects in order to develop capabilities of member countries to achieve water security, food security and poverty alleviation while preserving the environment. This program was initiated by setting up two regional nodes one in Iran and other in China in 2011 with the aim of providing regional platforms for NCs to conduct collaborative research based on their own resources and interests. This new collaborating research initiative is expected to generate synergy among member countries to conduct research programs regionally as concerted actions towards their common irrigation and drainage problems; and also assists ICID to fulfill its vision to develop updated knowledge of irrigation and drainage planning and practices worldwide.

Any collaborating mechanism requires proper mechanism and management. Realizing this need, meeting of the Management Board of Iran Node was organized by Iranian National Committee (IRNCID) in close cooperation with Khuzestan Water and Power Authority (KWPA) and ICID Central Office in the city of Ahwaz, Iran on 14-15 of August 2016 where representatives from Russia, South Korea, Iraq, Mali and Iran participated.

The program is based on the research capacities within the countries and the NCs play a crucial role in the process and facilitate multi-disciplinary inputs. Such an approach has been shown by IRNCID, by exploring possible collaboration with counterparts of other global professional organizations at country level and collaborating in a research program to establish a wastewater reuse network, particularly, in safe reuse of water in agriculture sector and urban purposes, including urban agriculture. A MoU has been signed between ICID and International Water Association (IWA) and I was honored to host the IWA President in Tehran in mid September 2016 to sign the MoU. This program will be supervised and monitored by two related workbodies (WG-PQW, WG-CROP) of ICID.

ICID family has invited many stakeholders involved in agriculture water management to the Second World Irrigation Forum (WIF2) to Chiang Mai in the second week of November 2016 and is enthusiastically looking forward to listening to their perspectives. I am hopeful that we will be able to hear from a number of Ministers and Senior Officials who have been invited. The event will host many stakeholders: decision makers to the regulators, academicians, researchers, thinkers, farmers, and young professionals involved in irrigation and drainage from all parts of the world.

It is heartening to note that with the active support of our NCs and THAICID, we are expected to have more than 50 Young Professionals, and more than 30 framers from different countries participating in the Forum. I will urge my colleagues to join the Senior Officers', Young Professionals' and Farmers' Roundtable meetings to listen to their perspectives. It is hoped that the related industries will take the opportunity by participating in the international exhibition to show case their capabilities and communicate with their counterparts and potential customers.

Come let us witness the greatest gathering of irrigation and drainage stakeholders at WIF2 and enjoy the Thai hospitality.

With regards,

Dr. Saeed Nairizi
President, ICID

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Inside

Management of Climatic Extremes with Focus on Floods and Droughts

This article is an extract of the Background Paper prepared by a team[1] under the leadership of Prof. Tsugihiro Watanabe (Japan) for the Sub-theme 2 of the Second World Irrigation Forum (WIF2) and aims at summarizing the current practices of managing extreme climate events, assessment of impact under the climate change scenario, and development of adaptation strategy under the recently adopted Agenda 2030 for Sustainable Development Goals (SDGs).

Climate change is recognized as one of the most serious and urgent issue for human society and global environment. In the context of agriculture, improving irrigation and drainage systems and rural development will play a key role in achieving the water and food security under impending climate change, especially in the developing countries.

A changing climate leads to changes in the frequency, intensity, spatial extent, duration, and timing of weather and climate extremes, and can result in unprecedented extremes. These climate extremes pose significant risk to human and ecological systems, which are influenced by changes in climate, vulnerability and exposure, resulting in increased fatalities and economic losses especially in developing countries.

To reduce the disaster risks, the global and local society or community need to assess the weather and climate events with their magnitudes, frequencies, and variabilities; the exposure of the society for these events; and the vulnerability of the region and society to these extremes. While the current local hydrological regime is being modelled with high reliability, the future projection of events and their impacts are expected to be more uncertain. Under the given uncertainties in climate change impact projections, improving resilience by reinforcing the capability of societies to better cope with the extreme events is one of the most favoured approach.

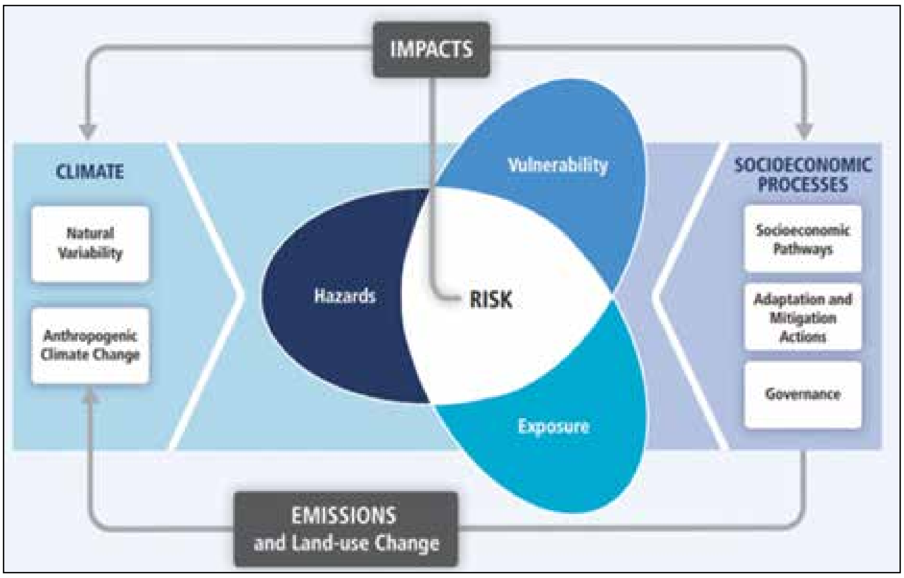
Farmers remain concerned about an increasing intensity of extreme weather events that will occur as a result of climate change. Weather related events which have impact on agriculture include are: (i) More frequent heatwaves; (ii) Erratic rainfall; (iii) Prolonged drought; (iv) More intensive rainfall spells; (v) Increased winter storms and hurricanes; and (vi) Rising sea level and increased salinization.

The risk of extreme events on the agriculture (or for that matter any socio-economic activity) is not only caused by the magnitude and extent of the hazard, like the duration of flood and drought, but is also governed by the exposure to the hazard and the vulnerability of the system to that event.

In order to reduce the disaster risk, the global and local society or community need to assess the weather and climate events in respect of their magnitudes, frequencies, variabilities as well as the vulnerability of the region and society, and the exposure for the events.

Under the current uncertainties in climate change projections, improving resilience of the local systems is one approach to reinforce the capability of societies to better cope with the extreme events. Since the factors associated with climate change and its apparent impacts are difficult to be projected and evaluated at the present level of scientific understanding it would be more effective and feasible to manage the extreme flood and drought through integrated and adaptive approaches.

1 Johannes Cullmann (WMO), Dr. Chandra S. Pathak (USA); Mika Turunen (Finland); Dr. Kamran Emami (Iran); Dr. Graziano Ghinassi (Italy); and Ms. Yasmin Siddiqi (ADB)



Risk of climate-related impacts results from the interaction of climate-related hazards with the vulnerability and exposure of human and natural systems (IPCC, 2014)

Particularly the coordinated adaptation measured are needed since autonomous adaptation might lead to the increase of emissions and degradation of ecosystems, which could further reinforce the negative impacts of the climate change. The adaptive management approach is briefly summarized as follows:

- The extreme events will affect natural resources such as soil fertility and available water resulting in increased vulnerability of agricultural production as the negative impacts, with serious water stress, land degradation and desertification as well as water logging and land inundation.
- The extreme flood and drought with changing temperature affect the hydrological condition of a basin and farmland, and will make it increasingly difficult to plan for cultivation activities such as each process in the cultivation and water management practices.
- When planning for the long term and assessing climate change risks, it is important to integrate how the different trends interact in a comprehensive manner to identify risk scenarios for the future. These trends influence and reinforce each other, and determinate risk levels through interconnected processes that are difficult to separate them in order to get a real sense of future risks, and policies that need to be setup to reduce them. Coordinated and effective adaptation strategies are essentially needed to ensure the long-term food and water security under changing climatic conditions.

Impacts of Climate Change on the Yield of Main Crops (in%)	
Irrigated Maize: -4 to -7	Rainfed Maize: -2 to -12
Irrigated Rice: -9.5 to -12	Rainfed Rice: -1 to +0.07
Irrigated Wheat: -10 to -13	Rainfed Wheat: -4 to -10

- Adaptation to climate change requires a multidisciplinary approach, and it requires the consideration of agro-climatological, technical and socio-economic issues. Innovative, coordinated and effective adaptation strategies require the capacity to adaptation to be continuously improved and targeted monitoring of the costs, benefits and impacts of the adapted policies.
- Many of adaptive management's benefits come in the form of better knowledge of ecosystem response to management actions. This improved knowledge reduces uncertainties and should therefore improve management decisions. These benefits are difficult to measure and translate into the standard metric of economic analysis. The intangible nature of these benefits stands in contrast to the direct, up-front costs of adaptive management programs, such as ecosystem monitoring programs, scientific staff, and institutional support.
- Response to drought, which has been reactive in most part of the world have proved to be ineffective in most cases. Whether droughts characteristics will change or not, it is imperative that a more risk-based approach to respond to drought is based on national drought policies, scientific monitoring and drought early warning systems. These drought early warning systems need to be used to put into motion well-rehearsed preparedness plans and widely disseminated.
- Floods need to be recognized to have multi-faceted ecological benefits but do turn into disasters if the vulnerable sections of the society are exposed, particularly in the extreme events. Integrated Flood Management approach that draws maximum benefits of flood plains within the framework of water resources management, land use planning and risk management principles need to be adopted.

Integrated Flood Management approach

- Adaptation to climate change to reduce vulnerability in the water sector should involve far more than just water managers. Mechanisms for interaction among various stakeholders, coordination among various agencies and collaboration among various disciplines for establishing better management systems needs to be promoted, not only against the climate change but also for everlasting improvement of the systems.

The full version of the Background Paper can be accessed at <**http://www.icid.org/wif2_bg_pap_st2.pdf**>.

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Key and Smart Actions to Alleviate Hunger and Poverty through Irrigation and Drainage

This article is an extract of the Background Paper prepared by a team[1] under the leadership of Dr. Olcay Unver, (FAO) for the Sub-theme 3 of the Second World Irrigation Forum (WIF2) and aims to summarizing the Sustainable Development Goals (SDGs), in particular, SDG 2: "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" and SDG 6: "Ensure availability and sustainable management of water and sanitation for all" are closely related to the alleviation of hunger and poverty and at the same time ensuring water security.

Agriculture is expected to feed an estimated population of more than 9 billion by the year 2050 through 60% increase over the 2006 food production levels, with 80% of the increase stemming from intensification which is essentially possible only under irrigation. At the same time, increasing water scarcity and demand for water resources from other sectors is putting unprecedented pressure on agriculture that uses approximately 70% of the total water withdrawal worldwide to release part of this water.

Internationally, food security has slowly, but markedly, improved during the past years. Despite that approximately 842 million people are still estimated to be experiencing chronic hunger. The 2013 Global Food Security Index (Figure 1) provides a worldwide perspective on the degree of vulnerability of various countries to food insecurity.

Access to adequate food in the rural areas of many developing countries depends heavily on access to natural resources, including water, that are necessary to produce food. About 17% of global agricultural land is irrigated and contributes about 40% of the global production of cereal crops (Bhattarai et al., 2002). Irrigated agriculture has proved to be as one of the important contributed of the world food security and specifically in reduction of rural poverty. Irrigated agriculture uses some 20% of the total farmland in the world but produces 40% of the food.

Role of irrigation and drainage in the alleviation of poverty has been the focus of many international communities and groups in the recent years. The benefits of irrigation can be attributed to higher production, higher yields, less reliance on weather condition, lower risk, and increase in farming activity year-round. It can be stated that there is a strong linkage between irrigation and drainage, and hunger and poverty alleviation, in which the poor benefits from well managed irrigation through higher yield, lower risk of crop failure, adoption of diversified cropping patterns, increased high-value and market-oriented crop production, and fixed employment.

Landless farmers may benefit less in short-term but enhancing productivity, increasing cultivated areas and providing adequate access to water creates more job opportunities for landless farmers, as well. Irrigated agriculture significantly contributes towards generating rural employment and maintaining rural livelihoods.

Poverty alleviation needs more attention and the needs are rapidly changing, and irrigation is only one lever to deal with it. To achieve a true and working irrigation and drainage as a catalyst in poverty alleviation, the international community should be guided by the following objectives:

- Increase the productivity of agriculture through effective and well managed irrigation and drainage systems to meet the demands of a rapidly growing population with a finite land and water resources.
- For individual countries to prioritize agricultural self-sufficiency first before being part of the international market economy.

- Revisit existing design of drainage, dams and pertinent structures to be climate change resilient and at the same time environmentally sound.
- Continue extensive research for innovative technology and solutions in irrigation.

These elements are grouped into governance, rights-based developments, water rights and pricing, management, efficiency improvement, and role of technology. Both the potential and the need to make use of innovative technology and solutions in irrigation are underlined and these can be used to cater the challenges in different sub-sectors. The main focus of these solutions are on maximizing productivity and efficiency, reducing water losses, achieving sustainable intensification and managing demands on water resources and the associated trade-offs.

Traditional surface irrigation practices have in the past been suitable for smallholders who are fortunate enough to have abundant low-cost supplies of water. However, the traditional practices, smallholders use do not utilize water very efficiently in terms of crop yield per unit of the water applied. Since water is usually the most critical factor that directly affects the crop production, it is critical that smallholders begin using more efficient water supply and irrigation technologies.

Finding right technology is the main challenge and providing appropriate and efficient irrigation system is not an easy task. It usually requires the development of low-cost and easy to operate systems. An appropriate technology is usually characterized as small scale, energy efficient, environmentally sound, labor-intensive, and controlled by the local community. In addition to technology, reform in policies and water governance is also required to facilitate the access of poor communities to the irrigation water.

Water Governance considers four dimensions of water - availability; stability; water quality; and access. Irrigation can help achieve food security however, expansion of irrigated agriculture and water development are possible in only in some countries especially in Africa with a potential of 43 million hectares that can be irrigated but only 13 million hectares are presently under irrigation. It was found that throughout the SADC region, only 8% of the cultivated area was equipped with irrigation facilities. The Southern African Development Community (SADC) member states need to take serious measures to increase investment in irrigation projects, in order to tap the potential of irrigation to increase agricultural productivity and food security, and reduce poverty.

In most of the other contexts modernization of irrigation systems is the only way forward to achieve improved water productivity and therefore food security. It is clear that more investment is going into the modernization of the existing systems to improve the efficiency of water use and increase the crop production.

Groundwater as a source of irrigation water accounts for about 40% - 112 Mha out of total 275 Mha - of the total irrigation in the world. In South Asia it accounts for more than 50% of the total irrigated area. However, in many cases groundwater being extracted annualy is not fully renewable resource and is depleting fast. Efforts need to be made to monitor groundwater use and changes in aquifers in order to sustainably use the resource.

Technological and technical solutions to improve efficiency and productivity of irrigation water are available, for example shifting, where appropriate, from low efficiency surface irrigation to high efficiency pressurized irrigation; lining of canals using appropriate technology, etc. These technologies and techniques are site and condition specific; and may not work if not accompanied by good operation and management. For these to be successful much needs to be done on soft side – for example capacity development of not only farmers but whole chain of actors from decision makers to service providers, to farmers.

Over the past many years, innovations in agriculture technology (precision agricultural innovations, data analytics and processing, platforms for the collection and distribution of complex data streams, and IT-driven extensions) have been on the rise. Through the use of these technologies along the entire agriculture value chain, the world can increase the productivity of its farming systems while simultaneously transforming agriculture into a source of environmental health. The crop sensing and modelling systems are able to remotely collect data such as humidity, barometric pressure, temperature, luminosity, wind speed, precipitation and soil moisture. These data, in turn, can predict the time and amount of irrigation.

Agriculture is the largest business sector which is highly driven by technologies and tools like satellite imageries, aerial imageries, GIS, GNSS/GPS, automated sensors, high tech machineries and high resolution data. The ultimate purpose of all the technologies is about optimization, precision, and to efficiently produce high crop yields. It can be noted that present innovative technology or solutions in irrigation can be used to cater the needs and challenges in different sub-sectors.

The full version of the Background Paper can be accessed at **<http://www.icid.org/wif2_bg_pap_st3.pdf>.**

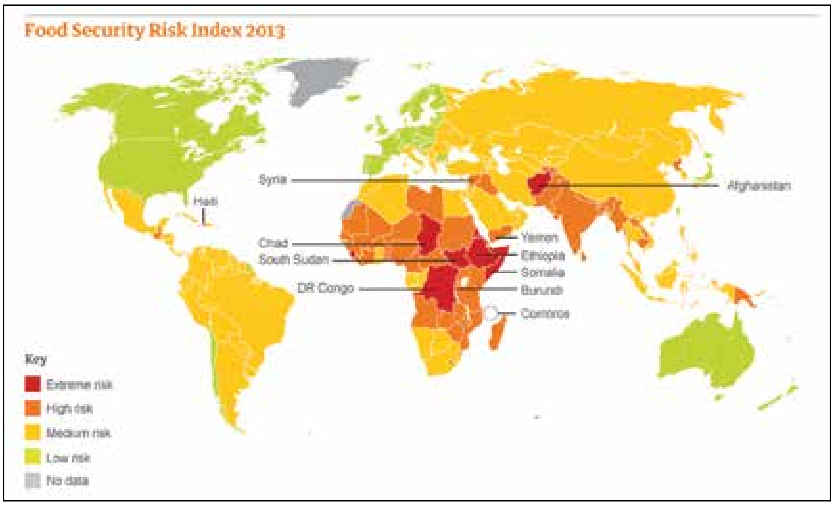


Figure 1. Food security index 2013 (The Economist Intelligence Unit Limited)

Country Profile – Kingdom of Thailand

Geography

The Kingdom of Thailand, a tropical land in the center of Indochina Peninsula, is bordered on the north by the Lao People's Democratic Republic (Lao PDR), on the east by the Lao PDR and Cambodia, on the south by the Gulf of Thailand and Malaysia, and on the west by Union of Myanmar and the Andaman Sea. The total land area is about 514,100 km2. The north and the west of the country contain mountainous area continuing into Myanmar and northeast is mainly plateau, which has Mekong River as a border with Laos. The east occupies short mountain ranges alternating with small basins of short rivers. The eastern area is adjacent to neighboring Cambodia. The south is a part of a peninsula located between the Andaman Sea and the Gulf of Thailand. The central Thailand is a large basin releasing river water into the Gulf of Thailand. This area contains large irrigation systems, and is a major rice producer for many centuries.

Climate

Locating 15 degrees north of the equator, Thailand has a tropical climate. The climate is mainly hot and humid across all of the regions and influenced by seasonal southwest monsoon and northeast monsoon. The seasons are divided into summer or pre - monsoon season (mid-February to mid-May), rainy or southwest monsoon season (mid-May to mid-October), and winter or northwest monsoon season (mid-October to mid-February). The temperature ranges between 19oC to 38 oC.

The northern part of Thailand is normally dry and has less rainfall during winter. The amount of rain will increase as the time getting closer to the rainy season. The highest amount of rainfall occurs around August-September. Rainfall in the southern part is abundant almost all of the time except during summer. The west coast has the highest amount of rainfall during September, while rainfall in the east coast reaches its peak at November.

Demographic

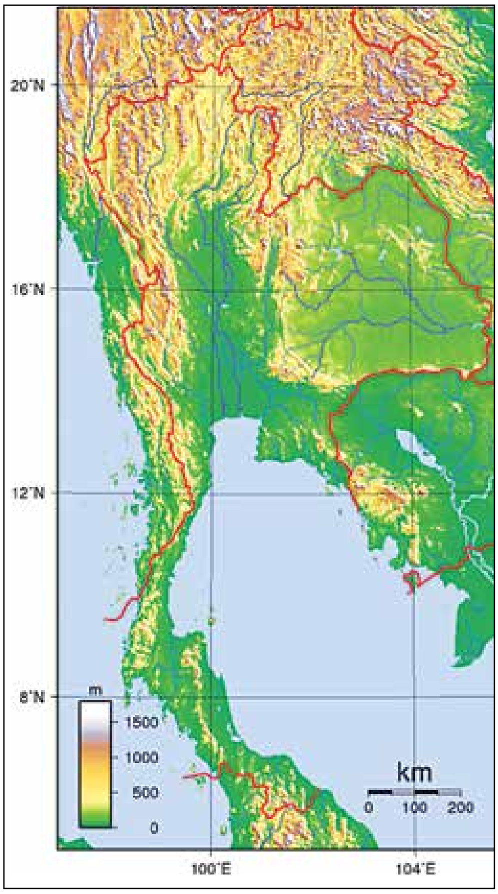
Thai population in 2016 is about 66 million, which ranks number 20 of all countries in the world. Around 40.7% of the population works in service and commerce, while agriculture and manufacturing are accounted for 38.7% and 20.6% respectively. Top 5 cities with highest population are Bangkok (7.98 million), Nakhon Ratchasima (2.49 million), Samut Prakan (1.88 million), Khon Kaen (1.72 million), and Ubon Ratchathani (1.71 million).

Water resources

Watershed areas in Thailand can be divided into 25 main watersheds and 254 small watersheds. Average annual precipitation is 1,379 millimeter. Total runoff is around 200,973 million m3, which equal to 3,086 m3 per person per year. The runoff is 175,345 million m3 (87.25%) during the rainy season, and 35,628 million m3 (12.75%) during the dry season. At present, catchment capacity is 74,788 million m3. Thailand's hydrology is highly variable due to the influence of monsoon and storms. As a result, frequent flooding and drought is experienced.

Agricultural land use

Thailand considers agriculture as the important foundation of the country. Agricultural activities usually gain support from the government as a mean for higher economic development. Thailand has an agriculture area around 239,000 km2. This can be classified into 112,000 km2 rice paddy field, 49,800 km2 field crops, 55,800 km2 fruit trees, and 2,200 km2 flowering plants.



Water requirements

The country's annual water requirement is around 151,750 million m3. Agriculture requires 113,960 million m3 or about 75% of the total. Water reservoirs and irrigation system are only accounted for 65,000 million m3. The remaining 48,960 million m3 is located outside of the irrigation zone, and depend on rainwater for agriculture. Water is also needed for maintaining ecology system (18%), consumption (4%), and manufacturing (3%).

Irrigation development in Thailand

Thailand has a long history of irrigation development. The weir and canal systems was practiced in Northern Thailand (Lanna) more than 700 years ago. During Sukhothai period (1249-1583) Sareedpongse strorage dam and conveyance system was constructed to supply water to Sukhothai and to irrigate paddy lands around the city. Later on during Ayudhhya period (1350-1767) and early Rattanakosin period (1782-1851) irrigation development were mainly canal digging to provide water supply, transportation, and irrigation. The Rangsit canal system and Chulalongkorn regulator were constructed around 1896 during the reign of King Rama V.

Modern irrigation development began in 1902 when King Rama V acquired the service of Mr. Yehoman vander Heide, a Dutch expert to make a plan for modern irrigation system in the lower Chao Phraya valley. However shortage of funding delayed the project and only small parts of the general plan were implemented. Only in 1957 that the Chao Phraya barrage, the major control structure of the project was completed. This was followed by completion of the major storage reservoirs, Bhumibhol Dam in 1964 and Sirikit Dam in 1971. From then on Thailand has constructed many large, medium and small scale storage dams and weirs with canal systems to serve the expanded irrigated area. At present, Thailand has about 5 million hectares of irrigated area making it to be in the top ten countries with largest irrigated area.

Challenges

At present, water resources projects are not easily approved due to area limitation and environmental issues. As a result the expansion of irrigation areas has slowed down, while Thai population and agricultural products demand are increasing. There is also the problem of decrease in forest area which results in increasing wet season runoff and reducing dry season stream flow. As a result, water becomes more valuable. Thailand needs to pay more attention on water resources management to ensure domestic water supply. Government water policies as well as innovative practices are required to improve water usage in all aspects at all levels. Economic growth and natural resources need to be carefully balanced in order to adopt sustainable development.

THAICID and ICID

Thailand joined ICID as a founder member country in 1950 and ever since Thailand has been actively participating in the activities of the Commission. The Thai National Committee on Irrigation and Drainage (THAICID) is hosted by Royal Irrigation Department, Ministry of Agriculture and Cooperatives. Presently, Mr. Sanchai Ketworrachai, Director General of Royal Irrigation Department is the Chairman of THAICID. Mr. M.L. Xujati Kambhu, Thailand (1964-1967); Mr. S. Ruanglek, Thailand (1983-1986); Mr. Chaiwat Prechawit , Thailand (2010-2013) have been the past Vice Presidents of ICID.

THAICID successfully organized the 8th Afro-Asian Regional Conference in 1991 on the theme "Land and water management in Afro-Asian countries". The Second World Irrigation Forum (WIF2) along with 67th International Executive Council meeting will be hosted at Chiang Mai city, Thailand from 6-12 November 2016 on the theme "Water management in a changing World: Role of Irrigation in Sustainable Food Production".

Announcement of the Second World Irrigation and Drainage Prize, 2016

Prof. Dr Bart Schultz (The Netherlands), a global expert in the field of drainage and lowland development has been selected by an eminent International Jury for award of the 2nd World Irrigation and Drainage Prize for his sustained, long standing and highly committed work to irrigation and drainage sector worldwide through education, research, planning and international project implementation.

Prof. Schultz, born in 1947, completed his Civil Engineering Degree and PhD from the Delft University of Technology with specialization in hydrology, drainage, irrigation.

His area of work includes land and water development, land reclamation, agriculture drainage, irrigation, flood management and environmental engineering.

Prof. Schultz started his professional carrier by joined IJsselmeerpolders Development Authority in 1973 as Head of the Section Water Management of Urban and Recreation Areas, where he was responsible for research and advising on water management aspects related to the development of the New Towns Almere, Lelystad and Zeewolde. In 1978 he took over as Head of the Water Management Division with responsibility of research and advising on water management aspects of land and water development projects. Prof. Schultz took charge as Head of the Environmental Engineering Department in 1994 to undertake the responsibility of advising and supervision on environmental engineering projects. He was appointed as Senior Advisor for the period 2002 – 2006 and later as Top Advisor from 2006 – 2009.

Prof. Schultz's inclination towards teaching and knowledge sharing took him to IHE to join as a Guest Lecturer from 1987-1990, where he had chance to interact with foreign students. From 1990-2012, he took over as part time Professor at IHE and from 2003 UNESCO-IHE. During his long and distinguished career as Professor, at UNESCO-IHE, Prof. Schultz has trained hundreds of graduate students at UNESCO-IHE and guided about 200 foreign students in their research for Master Degree and more than 15 for their PhD degree. The results of his research have been extensively applied by the government departments in planning and development of water resources in Indonesia, Estonia, Egypt, Sudan, Ethiopia, India, Pakistan, Central Asia, and The Netherlands, to name just a few.

He is a Member of the Royal Institution of Engineers in the Netherlands (KIVI), and the International Water Academy, Oslo, Norway and several professional bodies. Prof. Schultz has over 250 (English), 60 (Dutch), and 8 foreign technical publications in his credit. He was part of more than 250 missions abroad starting from 1976 and visited more than 30 countries.

Prof. Schultz is a firm advocate of technology transfer through exchange of experiences and has been actively involved in ICID activities for more than 35 years having served as its VP and then President. As President of ICID (1999-2002) he was instrumental in implementation of the Country Policy Support Program (CPSP) to contribute to develop effective options for water resources development and management to achieve an acceptable food security level and sustainable rural development. The project was funded by the Government of The Netherlands. He has chaired many Task Forces on the various World Water Foras and has been on the Editorial Board of the Irrigation and Drainage Journal (EB-JOUR) for more than 15 years.

Prof. Schultz will be presented with the 2nd World Irrigation and Drainage Prize at the Opening Ceremony of the 2nd World Irrigation Forum in Chiang Mai, Thailand, on 6 November 2016.

The World Irrigation and Drainage Prize is instituted by ICID to recognise the contribution of individuals and institutions promoting sustainable irrigation and enhanced agriculture production around the world. The Jury for the Second Edition of the Prize was Chaired by President Honoraire Dr. Chandra Moodrmooto, with members drawn from FAO, DWFI and ICID.

Hearty congratulations to Prof. Schultz.

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International Commission on Irrigation and Drainage (ICID) was established in 1950 as a scientific, technical and voluntary not-for-profit non-governmental international organization. The ICID News is published quarterly by ICID Central Office, New Delhi, India

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