



APCC-ASEAN

Disaster Management Final Regional Symposium 2017

Promoting and supporting multi-disciplinary dialogues
for disaster management practice and policy



**PROGRAM
BOOK**
JS Luwansa
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Message from the Executive Director, APCC



Fellow policymakers and scientists, welcome to the APCC-ASEAN Disaster Management Regional Symposium.

In 2016, the APEC Climate Center (APCC) began the ASEAN Science-Based Disaster Management Platform (ASDMP) project which has the objective of: "promoting scientific and technical research programs that study the causes and consequences of disasters and facilitate activities that promote and support the development of the means, methods, techniques, and equipment for disaster management, particularly in risk reduction". This project will be producing two main outcomes to achieve this objective including the ASDMP as well as a short-term and long-term research roadmap for DM issues currently faced and determining future research.

As the Executive Director of APCC, I am proud to host the Disaster Management Final Regional Symposium for the ASDMP Project to explore the topic: "promoting and supporting multi-disciplinary dialogues for disaster management practice and policy".

The Symposium will be the venue for the launching of the two main project outputs: (1) ASEAN Science-Based Disaster Management Platform, and (2) ASEAN Regional and Country-Based Roadmap. We also invited five prominent speakers to deliver keynote addresses during the Symposium that will guide us through the main and simple objective of bridging the gap between science and policy. The promotion and awareness of scientific and technical research as well as national policy priorities key in bridging this gap.

Each of the Symposium sessions will focus on different aspects of the issue. The Opening Ceremony will serve to officially announce the launch of the ASDMP and Research Roadmap, as well as applaud the outcomes of the ASDMP project coming to a close in December 2017. Session 1 will introduce a global perspective on disaster management in ASEAN and provide the background global framework on disaster management. Session 2 will focus on the current ongoing research efforts on disaster risk management (DRM) and disaster risk reduction (DRR) in the ASEAN region. Session 3 will focus on understanding the ASEAN member states' national frameworks on disaster management and identifying the scientific gaps in those frameworks, and Session 4 will allow us to identify tangible ways to connect science and policy through a keynote speech and a group activity.

To facilitate this format, we have invited policy makers and representatives from research organizations with a focus on the ASEAN region. I look forward to engaging with all of you during this Symposium to improve ASEAN's DRM/DRR efforts.

Thank you for your participation and interest,

Dr. Hong-Sang Jung
Executive Director
APEC Climate Center

Message from the Charge d'affaires a.i., Mission of the Republic of Korea to ASEAN



Dr. Jung, Hong-Sang, President of the APEC Climate Center, His Excellency Vongthep Arthakaivalvatee, His Excellency Prasong Vongkhamchanh, Executive Director Adelina Kamal, Excellencies, Distinguished participants and ladies and gentlemen,

First of all, I am very grateful to be here today, as we celebrate a very meaningful start. That is the launch of the ASEAN Science-Based Disaster Management Platform (ASDMP) and Research Road-map. As many of us are well-aware, it has been a long journey since this project was adopted at the Korea-ASEAN Commemorative Summit in 2014. I sincerely believe that the final outcomes of the hard works undertaken by the APCC, AHA Center and all the scientists and policy makers, who have been involved in this project, are worthy of our expectations.

At a time when we are about to witness the final outcomes, we are also well aware that this year marks the 50th anniversary of the founding of ASEAN. Since its inception, ASEAN has made remarkable strides in maintaining peace across Southeast Asia, accelerating economic growth, and improving the lives of the citizens of its 10 member states. Now, ASEAN has grown into the most important regional organization in East Asia, and has also become a model of sustaining harmony among its diverse member states.

Considering the fact that, ASEAN still remains as the most natural disaster-prone region in the world, we ought to remember that the remarkable achievement that ASEAN has accomplished can be sustained and expanded only if we are able to find better solutions for mitigating disasters in the region.

In this regard, I hope that the launch of the ASEAN Science-Based Disaster Management Platform, or ASDMP, and ASEAN Regional and Country-Based Road-map could be the important momentum for the development of disaster prevention in the region, while allowing ASEAN Member States (AMS) to enhance their levels of preparedness.

Ladies and gentlemen, Korea stands ready to be a key partner of ASEAN in realizing a resilient, people-oriented, people-centred ASEAN Community. And, as a catalyst for our progressive partnership, ASEAN-ROK Cooperation Fund (AKCF) enables to support further collaboration.

For last few years, ASEAN and ROK have been working closely with each other to further institutionalize the AKCF. The programme-based approach of the ASEAN-ROK Cooperation Framework was adopted by February this year with an aim of contributing the realisation of the ASEAN Vision 2025.

It is my sincere hope that the AKCF will serve as a very useful instrument in accommodating ASEAN's needs on disaster risk management through the collaboration with relevant Korean partners.

Distinguished Participants, I believe that the outcome of today's symposium will surely enrich the tangible ways to connect the research results and future policy directions.

On that note, let me once again congratulate the launch of the ASDMP and Research Road-map; and, I wish today's symposium a full success. Thank you.

Mr. Lim, Sang-beom
Charge d'affaires a.i.
Mission of the Republic of Korea to ASEAN



About the APEC Climate Center

The Asia-Pacific Economic Cooperation Climate Center (APCC) was founded with the unanimous endorsement and warm welcome of APEC senior officials and leaders at the first APEC Senior Officials Meeting (SOM) in Seoul, Korea, and was formally launched on November 18th, 2005 at the 13th APEC Economic Leaders' Meeting in Busan, South Korea.

APCC aims to contribute to economic growth and prosperity in the Asia Pacific region and support the protection of lives and property, the reduction of economic losses, and enhance economic opportunities. APCC enhances the socio-economic well-being of the Asia Pacific region by utilizing up-to-date scientific knowledge and applying innovative climate prediction techniques through our three main pillars of work: (1) climate prediction & climate information services; (2) climate information application & climate change response; and (3) capacity building.

APCC focuses on producing and sharing valuable and reliable high quality climate prediction information, applying that information to sectors through interdisciplinary research in the climate-environment-society nexus in order to minimize climate-related damages, and building capacity in both climate prediction and application

Since its establishment, APCC has played an important role in the region in providing climate information products and services based on a multi-model ensemble prediction system that utilizes climate forecast information from 17 leading climate forecasting centers and institutes in 11 countries. APCC is a leading climate information service provide in the Asia Pacific region, providing climate forecasts and information services, and utilizing these results to conduct research and implement development activities.

APCC has taken strides in enhancing the capacity of the Asia Pacific region through training programs and projects, and are specifically working with Pacific Island countries' national meteorological services on increasing their capacity in climate prediction and services. This work includes training programs, international workshop and conferences, as well as joint projects with various partners in multiple sectors including disaster, water, and agriculture management, as well as health and energy.



About the ASEAN Secretariat

The Association of Southeast Asian Nations (ASEAN) was founded on 8 August 1967 in Bangkok with the signing of the ASEAN Declaration by the Founding Fathers of ASEAN, namely Indonesia, Malaysia, Philippines, Singapore and Thailand. The ASEAN Declaration committed the signatory States to cooperate for the purpose of economic growth, social progress, cultural development, and regional peace and stability. Currently, ASEAN has ten Member States including the new members: Brunei Darussalam, Viet Nam, Lao PDR, Myanmar and Cambodia.

The ASEAN Declaration states that the aims and purposes of the Association are mainly to accelerate the economic growth, social progress and cultural development in the region, and to promote regional peace and stability through abiding respect for justice and the rule of law in the relationship among countries of the region and adherence to the principles of the United Nations Charter.

The ASEAN Secretariat was established in February 1976. The existing premise in Jakarta, which was donated by the Indonesian government, was officiated in 1981. The staffs are recruited locally and from the ASEAN Member States. The Secretary-General of ASEAN is appointed by the ASEAN Summit for a non-renewable term of office of five years, selected from among nationals of the ASEAN Member States based on alphabetical rotation. The four Deputy Secretaries-General of ASEAN come from four different Member States. They comprise two Deputy Secretaries-General who are nominated by ASEAN Member States on a rotational basis for a non-renewable term of three years and two Deputy Secretaries-General who are openly recruited based on merit.

The ASEAN Secretariat's basic function is to provide for greater efficiency in the coordination of ASEAN organs and for more effective implementation of ASEAN projects and activities. Its vision is to be the nerve centre of a strong and confident ASEAN Community that is globally respected for acting in full compliance with its Charter and in the best interest of its people. Its mission is to initiate, facilitate and coordinate ASEAN stakeholder collaboration in realizing the purposes and principles of ASEAN as reflected in the ASEAN Charter.



ONE **ASEAN**
ONE **RESPONSE**

About the AHA Centre

The ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) is an intergovernmental organization. The Agreement on the Establishment of the AHA Centre signed by the ASEAN Foreign Ministers, witnessed by the ASEAN Heads of State/Government from ten ASEAN Member States: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam on 17 November 2011 at the 19th ASEAN Summit held in Bali, Indonesia. The Center was set-up to facilitate cooperation and coordination among ASEAN Member States and with the United Nations and international organisations for disaster management and emergency response in the ASEAN region.

The AHA Centre reports to the Governing Board of the AHA Centre, which assumes the overall responsibilities and is accountable for the operations of the AHA Centre. The Governing Board comprises Heads of National Disaster Management Organisations (NDMOs) of the ASEAN Member States and the ASEAN Secretariat as an ex-officio member. The AHA Centre serves as the Secretariat of the Governing Board. Hosted by the Government of Indonesia, the AHA Centre serves the Member States from its Office in Jakarta.



APCC-ASEAN Disaster Management Final Regional Symposium 2017

I Symposium General Description

The APCC-ASEAN Disaster Management Regional Symposium is one of many 3 workshops that will be held within the context of the ASDMP project. These workshops serve to assess information needs, enhance collaboration and communication among scientists and practitioners, and develop short and long-term policy-oriented multidisciplinary research priorities and programs.

Through this symposium, APCC hopes to bring together many policymakers and scientists in the ASEAN region to launch the ASDMP web platform and the disaster management research regional roadmap as well as to promote and support multi-disciplinary dialogues for disaster management practice and policy.

In order to facilitate the achievement of the event's objectives, the program has been divided into four main sessions with the themes outlined in the table below:

	Day 1 [4 December]	Day 2 [5 December]
AM	<ul style="list-style-type: none"> • Opening Ceremony • Session 1: Global Perspective of Disaster Risk Reduction 	<ul style="list-style-type: none"> • Session 3: National Frameworks on Disaster Management and Scientific Gaps
PM	<ul style="list-style-type: none"> • Session 2: Current Disaster Risk Reduction Research Efforts • Welcome Dinner 	<ul style="list-style-type: none"> • Session 4: Connecting Science and Policy for Disaster Risk Reduction • Closing Ceremony

Opening Ceremony

The opening ceremony (open to the media) will serve to officially announce the launch of the ASDMP and Research Roadmap, as well as applaud the outcomes of the ASDMP project coming to a close in December 2017. APCC will provide a demonstration of the ASDMP as well as provide an overview of the Research Roadmap.

Session 1

This session will focus on the global perspective on DRR/DRM in the ASEAN region so that the Symposium can begin with the larger picture in mind. There will be three keynote speakers: (1) a disaster management expert that has been working in the field for many decades, (2) a representative from the UNISDR to provide us the global framework context with the SDG's and Sendai Framework, and (3) a representative from ADPC to discuss the ASEAN regional perspective on the usage of science and technology in DRR/DRM.

Session 2

This session will focus on increasing the awareness of the current ongoing research efforts on DRR/DRM in the ASEAN region with multiple presentations from various scientists on their current research focuses and projects. There will also be a poster session to allow participants to see a large array of various science and technology innovations being cultivated in the ASEAN region.

Session 3

This session will focus on understanding the ASEAN member states' national frameworks on disaster management by discussion lessons learned from previous disaster events to identify the scientific gaps in those frameworks. Representatives from the ASEAN Committee on Disaster Management will deliver presentations on their respective frameworks and the scientific challenges they are facing. This will allow researchers to better understand the type of science that is needed in the ASEAN region.

Session 4

This session will focus on identifying tangible ways to connect science and policy in the ASEAN region. There will be a keynote address on implementing DRR under the Sendai Framework, showing how DRR and DRM measures can fit into a global policy framework. Then, there will be a group activity to increase the interaction between the scientists and policymakers in the room to determine the current challenges that are causing the gap between science and policy and concrete next steps to work towards bridging that gap.

II Symposium Agenda

Time	Session	Agenda Item	Speaker
December 4 (Rapha 1 & 2)			
8:30 – 9:00	Registration		
9:00 – 9:10	Opening Ceremony MC: Dr. Jinyoung Rhee	APCC Opening Remarks	Dr. Hong-Sang Jung <i>(Executive Director, APCC)</i>
9:10 – 9:25		ASEAN Congratulatory Remarks	H.E. Vongthep Arthakaivalvatee <i>(ASEAN Deputy Secretary-General)</i>
9:25 – 9:40		ACDM Congratulatory Remarks	H.E. Prasong Vongkhamchanh <i>(Chair, ASEAN Committee on Disaster Management)</i>
9:40 – 9:55		ROK Mission to ASEAN Congratulatory Remarks	Mr. Lim Sang-beom <i>(Charge d'affaires a.i. Mission of the Republic of Korea to ASEAN)</i>
9:55 – 10:10		AHA Centre Congratulatory Remarks	Adelina Kamal (TBD) <i>(Executive Director, AHA Centre)</i>
10:10 – 10:20		ASDMP Project Video	
10:20 – 10:30		Official Project Outcome Handover Ceremony and Ceremonial Photo	
10:30 – 10:40		Group Photo	
10:40 – 11:10		Coffee Break (Press Conference)	
11:10 – 11:30		Official Launch of Research Roadmap	Dr. Jinyoung Rhee <i>(Research Fellow, APCC)</i>
11:30 – 11:50	Official Launch and Demonstration of ASDMP Platform	Dr. Hyunrok Lee <i>(Team Leader, APCC)</i>	
11:50 – 13:00	Lunch		
13:00 – 13:20	Session 1: Global Perspective of Disaster Risk Reduction, focusing on the ASEAN region	Keynote 1: Ten Priorities for Disaster Risk Management within the ASEAN Region	Dr. Ian Davis <i>(Visiting Professor, Oxford Brookes University)</i>
13:20 – 13:30		Keynote 1: Q&A	
13:30 – 13:50	Session Chair: Dr. Ian Davis	Keynote 2: The key role of DRR in the overall 2030 Agenda for Sustainable Development	Mr. Andrew McElroy <i>(Pacific Sub-Office Head, UNISDR)</i>
13:50 – 14:00		Keynote 2: Q&A	
14:00 – 14:20	Rapporteur: Prof. Chris Gouramanis	Keynote 3: Regional perspective on science and technology innovation in reducing climate and disaster risk	Mr. Aslam Perwaiz <i>(Deputy Executive Director, Asian Disaster Preparedness Center)</i>
14:20 – 14:30		Keynote 3: Q&A	
14:30 – 14:45	Session 2: Current DRR research efforts Session Chair: Prof. Manzul Kumar Hazarika Rapporteur: Dr. Seungsoo Lee Dr. Daeha Kim	Current Project Presentations: Global Initiative on Disaster Risk Management	Mr. Stephan Huppertz <i>(Regional Coordinator Asia, GIDRM)</i>
14:45 – 15:00		Current Project Presentations: Hydro and Agro Informatics Institute	Dr. Sutat Weesakul <i>(Director, HAI)</i>
15:00 – 15:20		Coffee Break	
15:20 – 15:35		Current Project Presentations: Typhoon hazards in central Vietnam - environmental signatures, sustainable coastal development and resilience to coastal hazards	Prof. Chris Gouramanis <i>(Assistant Professor, National University of Singapore)</i>
15:35 – 15:50		Current Project Presentations: UN Economic and Social Commission for Asia and the Pacific	Dr. Benjamin Thiebes <i>(Consultant and Expert on Landslide)</i>
15:50 – 16:05		Current Project Presentations: Disaster risk reduction projects in the agriculture sector	Dr. Hideki Kanamaru <i>(Natural Resources Officer, Food and Agriculture Organization)</i>
16:05 – 16:15		Q&A	

Time	Session	Agenda Item	Speaker	
16:15 – 16:25	Session 2: Current DRR research efforts Session Chair: Prof. Manzul Kumar Hazarika Rapporteur: Dr. Seungsoo Lee Dr. Daeha Kim	Current Project Presentations: Climate information-based water-agriculture risk assessment in Thailand	Dr. Boksoon Myoung <i>(Research Fellow, APCC)</i>	
16:25 – 16:35		Current Project Presentations: Development of smart groundwater management system in the Kingdom of Tonga	Dr. Sunkwon Yoon <i>(Research Fellow, APCC)</i>	
16:35 – 16:45		Current Project Presentations: Sensitive effectiveness of a structural adaptation for reservoir systems to climatic stresses	Dr. Daeha Kim <i>(Research Fellow, APCC)</i>	
16:45 – 16:55		Current Project Presentations: Development of real-time urban inundation forecasting system using remote sensing information	Dr. Seungsoo Lee <i>(Research Fellow, APCC)</i>	
16:55 – 17:10		Q&A		
17:10 – 18:00		Poster Session Activity	Mr. Ahmad Fairuz Mohd Yusof <i>(Disaster Management Unit Head, Selangor State Government Office)</i> Ms. Nurul Syazwani Yahaya <i>(Graduate Researcher, SEADPRI)</i> Ms. Jittiporn Chantarojsiri <i>(Collaboration Section Head, HAI)</i>	
18:00 – 20:00		Welcome Dinner		
December 5 (Rapha 1 & 2)				
9:00 – 9:15		Session 3: National Frameworks on Disaster Management and Scientific Gaps Session Chair: Mr. Aslam Perwaiz Rapporteur: Mr. Stephan Huppertz Dr. Benjamin Thiebes	ACDM Presentation: Indonesia	
9:15 – 9:30			ACDM Presentation: Lao PDR	
9:30 – 9:45	ACDM Presentation: Malaysia			
9:45 – 10:00	ACDM Presentation: Myanmar			
10:00 – 10:15	Q&A			
10:15 – 10:35	Coffee Break			
10:35 – 10:50	ACDM Presentation: Philippines			
10:50 – 11:05	ACDM Presentation: Singapore			
11:05 – 11:20	ACDM Presentation: Thailand			
11:20 – 11:35	ACDM Presentation: Vietnam			
11:35 – 11:50	Q&A			
11:50 – 13:00	Lunch			
13:00 – 13:20	Session 4: Connecting Science and Policy for DRR	Keynote 4: Implementing a National Disaster Risk Assessment under the Sendai Framework of DRR	Prof. Manzul Kumar Hazarika <i>(Director, Geoinformatics Center, Asian Institute of Technology)</i>	
13:20 – 13:30		Keynote 4: Q&A		
13:30 – 13:40	Session Chair: Ms. Donna Lagdameo Rapporteur: Ms. Nurul Syazwani Yahaya	Keynote 5: Bridging Science, Policy and Practice	Ms. Donna Lagdameo <i>(Senior Policy Adviser, Red Cross Red Crescent Climate Centre)</i>	
13:40 – 15:10		[Activity] Bridging Science, Policy and Practice	Ms. Donna Lagdameo <i>(Senior Policy Adviser, Red Cross Red Crescent Climate Centre)</i>	
15:10 – 15:30	Coffee Break			
15:30 – 16:10	Closing Ceremony	Workshop Wrap-Up Discussion	Session Chairs	
16:10 – 16:25		Evaluation		
16:25 – 16:30		Closing Remarks	Dr. Hong-Sang Jung <i>(Executive Director, APCC)</i>	
16:30 – 17:00	MC: Dr. Jinyoung Rhee	Closing Networking Coffee Reception		

III Invited Keynote Speakers

Session I. Keynote 1

Professor Ian Davis

Visiting Professor in Disaster Risk Management
Kyoto, Lund and Oxford Brookes Universities



Ian Davis, has worked in the disaster risk management field since 1972. He trained and practiced as an architect and architectural lecturer before specialising in Shelter after Disaster. This was the subject of his Phd. in University College London (UCL), his first book (1978) and in editing the first set of UN guidelines on this subject (1982 and Second Edition 2015). During the past forty-five years he has worked in all aspects of Disaster Management and Climate Change in academia, consultancies, NGO Management, Governments and UN organisations. In 1996 he became the first British Citizen to receive the UN Sasakawa Award for his 'contribution to international disaster prevention'.

He has worked extensively in the Asian region in Bangladesh, Cambodia, P.R.China, India, Indonesia, Japan, Malaysia, Nepal, Pakistan, Philippines and Vietnam and is the author, editor or co-editor of a number of books that relate to the Asian Region including:

- Disaster Mitigation in Asia and the Pacific (1991) ADB: Manila;
- Disaster Risk Management in Asia and the Pacific (2015) ADBI:Tokyo Routledge: Abingdon
- Disaster Risk Reduction for Economic Growth and Livelihood: Investing in resilience and development (2015) JICA: Routledge: Abingdon

ABSTRACT

Ten Priorities for Disaster Risk Management within the ASEAN Region

NATIONAL POLICIES/ PROGRAMMES:

1. Address the 'drivers of risk' with political courage and persistence

This politically sensitive topic, was seriously neglected in the Sendai Framework for Disaster Risk Reduction. Governments need to form coalitions with civil society (media/ religious groups/ educationalists / pressure groups/ community groups, etc) to focus public and media attention on the forces that 'create, drive, maintain and expand risks'. Risk Drivers will be cited.

2. Ensure that a well-developed risk assessment system is in place for all high-risk areas:

- Hazard Mapping: (location, severity, frequency, duration, impact characteristics)
- Vulnerability and Capacity Assessment: (social, economic, physical, environmental, governmental resources and assets)
- Loss Estimation: (in all the above sectors) Having noted these two fundamental priorities (Priorities 1 and 2) , The next question is how to ensure a lasting impact? I suggest the following approaches:

3. Allocate priority resources for education and training at every level:

Primary and secondary school children and their teachers; general public awareness, training of key occupations: building/ agriculture/ fisheries / public health etc. undergraduate and higher education; government officials and politicians. Examples will be cited

4. Link departments, policies and protocols dealing with Disaster Risk Reduction and Climate Change Adaptation to avoid duplication and achieve greater impact.

The need is for well co-ordinated approaches. Full integration may be possible, but there is a danger with integration of making a larger body that is unmanageable and dysfunctional.

5. Adopt over-arching holistic policies in the management of hazard risks

The need is to avoid ineffective, piecemeal attention to isolated fragments of risk reduction, rather than regarding each element within their natural broad context. Examples will be cited

6. Recognise the power of communities to manage the risks they face

Communities can identify, assess, manage, reduce the risks they face and undertake recovery actions. Many measures they can adopt are at no or low financial cost. Community work needs to be integrated with the investment in risk reduction and recovery undertaken by governments

REGIONAL COOPERATION

7. Exchange knowledge throughout the region

By circulating experienced officials within the region who have experience and rich knowledge to share concerning risk reduction and recovery plans and progress. Examples will be cited

8. Develop close Regional Cooperation to manage hazards that cross national boundaries

Forecasts/ warnings, river catchments requiring unified approaches, higher education, emergency services cooperation, protocols for risk reduction and recovery management

9. Undertake risk assessment of potential 'compound disasters' that have the potential for regional/ international impacts

Conduct specialised risk assessment of the potential of one disaster to trigger 'knock-on' regional or international impacts. Examples will be cited

10. Establish Regional Protocols concerning International Assistance following Disasters

These can include search and rescue; medical assistance; appeals and pledging procedures; damage and needs assessment; language, competency and capacity criteria for the post-disaster admission of international groups/ volunteers. Examples will be cited

Session I. Keynote 2

Dr. Andrew McElory

Pacific Coordinator
United Nations Office for Disaster Risk Reduction (UNISDR)



UNISDR supports the implementation, follow-up and review of the Sendai Framework for Disaster Risk Reduction 2015-2030, a 15-year agreement that aims to prevent and reduce disaster risk through an all-of-society approach under the leadership of national governments.

I have worked for UNISDR for almost five years, previously based at its:

- Regional Office for Asia Pacific, in Bangkok, Thailand;
- Office for North-East Asia & Global Education Training Institute, in Incheon, South Korea; and
- Headquarters, in Geneva, Switzerland

Before joining UNISDR, I worked for the International Federation of Red Cross Red Cross Societies (IFRC) for more than 12 years. I focused on disaster management and organizational development of national Red Cross Red Crescent societies in Asia, Middle East, Central Asia and the Caucasus.

Prior to IFRC I was a newspaper journalist for 14 years based out of the UK, Australia, New Zealand, Israel and Viet Nam.

ABSTRACT

The Key Role of DRR in the Overall 2030 Agenda for Sustainable Development

Disaster risk management is an old issue with a newer focus. The 2030 Agenda for Sustainable Development reflects a more progressive understanding of disasters, development and climate change.

The Sendai Framework for Disaster Risk Reduction – one of the main pillars of the 2030 Agenda – has continued to strengthen public and institutional understanding of disaster risk as well as generate increased political commitment to prevent and reduce disaster risk.

It builds on the progress of the Hyogo Framework for Action during the previous decade. It has led to significant achievements. The world – and the ASEAN region – has reduced mortality from disasters, especially from those related to weather/climate over the past last decade.

However, major challenges remain. First and foremost, we have so far failed to reverse the growth in the risk of disasters. The escalating cost of disasters continues to undermine regional and global efforts to achieve sustainable development. Managing disaster risk represents a solid step towards sustainable development. The presentation will explain how effective risk management is a headline message from the Sendai Framework that connects the whole 2030 Agenda for Sustainable Development.

It will focus on the progress and challenges within the ASEAN region. The presentation will conclude with an overview of how the 2018 Asian Ministerial Conference on Disaster Risk Reduction in Mongolia represents an important milestone in regional efforts to prevent and reduce disaster risk.

UNISDR – the UN Office for Disaster Risk Reduction – is part of the UN secretariat and is mandated through the UN General Assembly to be support the implementation and monitoring of the Sendai Framework for Disaster Risk Reduction 2015-2030.

Session I. Keynote 3

Mr. Aslam Perwaiz

Deputy Executive Director
Asian Disaster Preparedness Center



Mr. Aslam Perwaiz is the Deputy Executive Director (DED) of Asian Disaster Preparedness Center (ADPC) overseeing the thematic programs. Mr. Aslam has been working with ADPC for 12 years on multiple programs and projects on disaster risk reduction. He served as the Department Head of Disaster Risk Management Systems (DRMS) Department until August 2017. He has represented ADPC at national, regional and international platforms on disaster and climate risk management. Among other notable initiatives, he initiated the ADPC's private sector engagement "iPrepare Business" facility and post-disaster needs assessment initiative "Ready4Recovery".

Prior to joining ADPC, he worked with the United Nations Development Program (UNDP), World Wildlife Fund (WWF) and the Institute of Economic Growth (IEG) in India.

ABSTRACT

Regional Perspective on Science and Technology Innovation in Reducing Climate and Disaster Risk

The conceptual basis for disaster risk reduction is undergoing significant change, partly as a result of ASEAN Science-Based Disaster Management Platform (ASDMP). The common view of disasters as simply hazards or events is now challenged by the view that disaster risk is the outcome of both natural and human influenced factors, with risk expressed in terms of potential losses of lives, assets or income. This is shaping new approaches to science and practice in disaster risk reduction, resilience building and climate change adaptation. Also, greater attention is being given to other sources of disaster risk, beyond natural hazards alone.

Building on the achievements in ASEAN member countries, the science and technology community needs to urgently take action to advance the work at different levels in 2017 and beyond. The ASEAN Agreement on Disaster Management and Emergency Response or AADMER has been effectively facilitating regional cooperation on science and technology between and among ASEAN Member States. The Asian Disaster Preparedness Center (ADPC) has been supporting and aligned with the ASEAN's aims and goals in reducing climate and disaster risks in the member countries. We are a vehicle for effective disaster risk reduction (DRR) in Asia Pacific particularly in promoting regional cooperation on scientific innovation such risk identification, risk governance and geospatial data analysis but also a useful complement to the global initiatives as we are steeped in operational capacity through the links to NDMOs and practical agencies at the national and local level.

Session IV. Keynote 4

Professor Manzul Kumar Hazarika

Director
Asian Institute of Technology



Dr. Manzul Kumar Hazarika is currently working as the Director, Project Operations at the Geoinformatics Center of the Asian Institute of Technology (AIT), Thailand.

Over the past 13 years, he has extensively worked in disaster management issues in more than 20 developing countries from the Asia-Pacific as well as the Caribbean regions. His work includes multi-hazard risk assessment, emergency mapping and damage assessment, community-based disaster management, and capacity building. While working, he interacted and worked closely with stakeholders at various levels including high-level government officials and donor agencies and he has developed a rich network of professionals and institutions through partnerships and inter-agency liaisons. He has also published several research articles on applications of Remote Sensing and GIS in disaster management and related topics. He holds a Ph.D. degree in Civil Engineering from the University of Tokyo, Japan, a M. Eng. Degree in Remote Sensing and GIS from the Asian Institute of Technology (AIT).

ABSTRACT

Implementing a National Disaster Risk Assessment under the Sendai Framework of DRR

Rapid population growth and urbanization, combined with extreme climatic events, are causing a rapid increase in the risk of the communities exposed to natural hazards and there is a tenfold increase in losses caused by disasters this decade over the last decade.

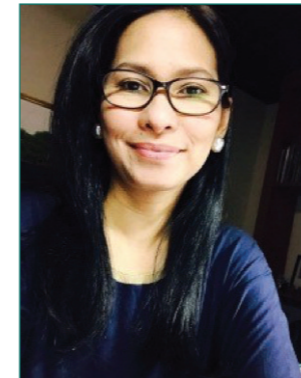
Risk assessment is a basic requirement for an effective disaster risk reduction and sustainable development. A substantial progress was made in developing tools for hazard and risk assessment, and producing risk information at different levels and scales across the world during the decade of the Hyogo Framework for Action (2005-2015). In the Sendai Framework for Disaster Risk Reduction (2015-2030), understanding disaster risk has become the first priority for action and it states "policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment". The Sendai Framework further calls for multi-hazard management of disaster risk based on understanding small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters caused by natural or human-generated hazards, as well as related environmental, technological and biological hazards and risks.

Risk information will be useful for taking necessary mitigation measures to protect lives, assets, and infrastructures. Risk assessment is commonly carried out by integrating hazard and vulnerabilities of the exposed elements-at-risk, and many different and complementary methods and tools are available for analyzing risk. These range from qualitative – based on the subjective perceptions of experts – to semi-quantitative and quantitative methods: probabilistic risk analysis, deterministic or scenario analysis, historical analysis and expert elicitation. For effective disaster risk management, it is critical to have an understanding of risk from all hazards, interlinkages between hazards and vulnerabilities, and comparison of different types of risk. Establishing a national system for understanding disaster risk that would act as the central repository of all publicly available risk information, which would lead the implementation and updates of national disaster risk assessment for use in disaster risk management, including for risk-informed disaster risk reduction strategies and development plans.

Session IV. Keynote 5

Ms. Donna Lagdameo

Senior Policy Advisor and Asia Pacific Regional Focal Point
Red Cross Red Crescent Climate Centre



In March 2013, Donna joined the Climate Centre and provides technical support on DRR and CCA to the RCRC family in Asia, particularly, Southeast Asia.

Since 1995, Donna has been specializing in policy development, governance and evidence-based advocacy and knowledge management in Disaster Risk Reduction and Climate Change Adaptation in the Philippines and in the Asia Pacific region. She likewise represents the International Federation of Red Cross and Red Crescent Societies (IFRC) in the various UNFCCC processes including loss and damage and adaptation. She was part of the team that developed and advocated for the passage of the new DRRM Law in the Philippines and wrote the National DRRM Framework and Plan under UNISDR support. Donna studied Political Science (BA), International Studies (MA) and is completing her Doctor of Public Administration degree all from the University of the Philippines. Her professional career includes work in the Philippine government (Senate, House or Representatives, Department of National Defense, Development Academy of the

Philippines), Oxfam, and a number of consulting work for UNDP, UNISDR, ECHO, various international NGOs, international organizations and donor groups. Donna is married and has 4 daughters.

ABSTRACT

Bridging Science, Policy and Practice

In the past decades, there has been a sharp increase in weather-related disasters. Climate change is aggravating these risks. There is an urgent need to better manage the rising risk of extreme weather events through better early-warning, better disaster relief and risk reduction and climate-smart programmes for healthcare, water and sanitation, and food security. We need to make the best global scientific insights operable at the local policy and practice levels. Key elements include support for climate-smart risk reduction, lobby and advocacy, awareness raising and capacity building, especially in developing countries, where people are most at-risk to the adverse impacts of climate change. Policy needs to be geared toward inclusive and climate-smart development planning, through multi-stakeholder dialogues.

Increasing climate risk threatens hard-earned development gains. A strategy to incorporate better climate risk management in development and humanitarian decision making processes is to better understand and pre-empt climate related hazards through systematic use of climate information across timescales for early warning and subsequently investing in improved early action. Being the largest humanitarian network in the world, we recognize that one of the key methods for coping with and adapting to increasing climate risk is by utilizing 'Early Warning, Early Action' (EWEA) through, for example, Forecast Based Financing (FBF). These approaches use available forecast information before a humanitarian emergency occurs, with the goal of systematically triggering action to improve preparedness and response. Not only can action be taken at different stages based on available information with different lead times, action can also be taken at various levels. This includes community level preparedness, national contingency planning based on scenarios, as well as mobilizing human and financial resources ahead of a disaster.

To better understand EWEA within humanitarian and development work in a changing climate, we develop and utilize different participatory tools, including serious games. Like climate change adaptation, well-designed games involve decisions with immediate consequences. Games enable us to think about global environmental and social change, and to explore in a rational yet sensory and creative way the sometimes surprising or counter-intuitive outcomes of our individual and collective decisions. Through game-enabled participatory processes, desired learning and dialogue outcomes can be deeper, more robust and durable. This is because games can cultivate, motivate and inspire, out-of-the-box, creative thinking and can encourage peer-to-peer learning among diverse stakeholders by enabling players to collectively 'inhabit' a complex system and share the "Huh?" (confusion) and "AHA!" (revelation) moments. Games can help humanity tackle a changing climate where complexities, volatilities and uncertainties may be the hallmarks of a new normal.

In this session we will experience how, through a gameplay called Paying for Predictions, decision makers will be able to link science into their policy work and sustained actions on the ground. Through an interactive discussion, we hope to accomplish what is aimed for, more efficiently than other approaches and can offer numerous advantages over more linear, traditional forms of teaching and learning.

ASEAN Science-Based Disaster Management Platform (ASDMP)

I ASDMP Project Information

The ASEAN Science-Based Disaster Management Platform project (ASDMP) seeks to promote “scientific and technical research programmes that study the causes and consequences of disasters and facilitate activities that promote and support the development of the means, methods, techniques, and equipment for disaster management, particularly in risk reduction” (ASEAN 2013). This project is funded by the Government of Korea through the ASEAN-ROK Special Cooperation Fund, and is currently being implemented by the APEC Climate Center (APCC) and the ASEAN Coordinating Centre for Humanitarian Assistance (AHA Centre).

Project Title	ASEAN Science-Based Disaster Management Platform (ASDMP project)	
Donors	ASEAN-ROK Special Cooperation Fund - Government of Korea	
Implementing Agencies	- APEC Climate Center (APCC) - ASEAN Coordinating Centre for Humanitarian Assistance (AHA Centre)	
Objective	To promote the involvement of science in policy development and policymakers in the research process for disaster management and risk reduction in the ASEAN region	
Project Period	2016 – 2017	
Total Funding	USD ~500,000.00	
Impacted Countries (10 total)	Nation of Brunei Kingdom of Cambodia Republic of Indonesia Lao People’s Democratic Republic Malaysia	Republic of the Union of Myanmar Republic of the Philippines Republic of Singapore Kingdom of Thailand Socialist Republic of Vietnam

The ASDMP project aims to reduce the ASEAN region’s vulnerability to extreme climate events including earthquakes and volcanic events, and help policymakers plan for increased resiliency to extreme climate events through two main outputs:

- Output 1:** Research and knowledge products and future research areas that are useful to policy making and practice of disaster management are determined, promoted, and supported
- Output 2:** Scientific and technical research products and knowledge promoted and disseminated and cross-sectoral collaboration and communication enhanced

In order to achieve the above outputs, APCC and AHA Centre will focus on developing two major outcomes:

- (1) Science-Based Disaster Management Platform (2) Research Roadmap on DRM Issues.

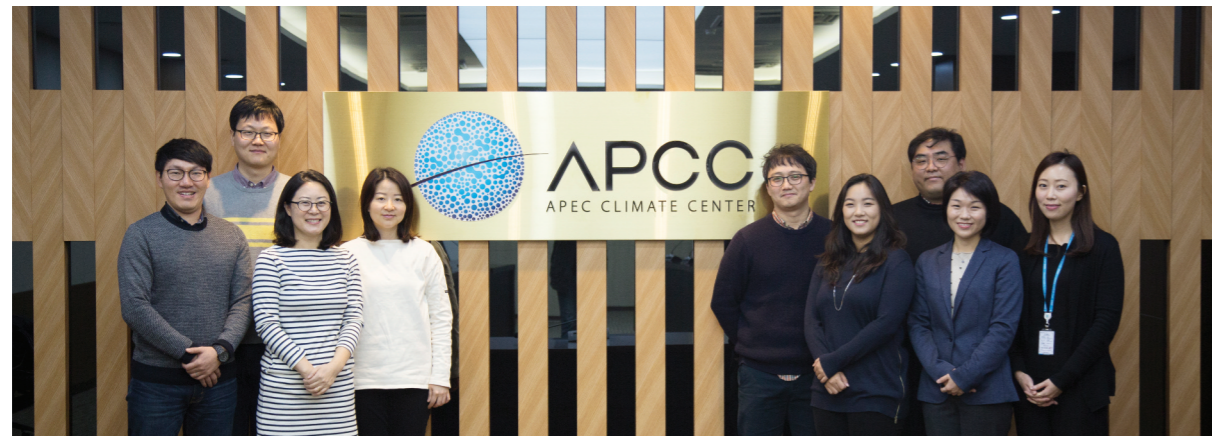
The *Science-Based Disaster Management Platform* seeks to promote and disseminate scientific and technical research products and knowledge, as well as enhance cross-sectoral collaboration and communication. It will serve these purposes by providing an online platform similar to a knowledge library containing research performed by scientists in the ASEAN region on extreme climate events as well as earthquakes and volcanic activity in the ASEAN region. This platform will serve to facilitate the exchange of scientific knowledge, methodologies, and other information that contributes to the effective application of science in risk mitigation and disaster prevention

The *research roadmap on DRM issues* seeks to determine, promote, and support research and knowledge products as well as future research areas that are useful to policy making and the practice of disaster management in the ASEAN region. APCC will develop a research roadmap that will help identify the needs and gaps in knowledge regarding disaster management

Involving the AHA Centre, NDMOs, and scientists in the development process of these two outcomes will ensure the sustainability of this project.

The implementing parties also organize cross-sectoral workshops and symposiums, such as the Kickoff Workshop held in March 2016, APCC-ASEAN Disaster Management Regional Symposium held in February 2017, as well as this APCC-ASEAN Disaster Management Final Regional Symposium, to assess information needs, enhance collaboration and communication among scientists and practitioners, and develop short and long-term policy-oriented multidisciplinary research priorities and programs.

II ASDMP Project Team



Dr. Jinyoung Rhee, Principal Investigator



Dr. Jinyoung Rhee joined APCC in February 2013 as a Research Fellow. She earned her Ph.D. in Geography at the University of South Carolina, Columbia, USA in 2007, where she developed a regional drought monitoring system for the Carolinas. For the previous years, she worked at the Carolinas Integrated Sciences & Assessments of the University of South Carolina as a Research Associate specializing in climatology, geographic information science, and drought monitoring. She has been involved in multiple NOAA-sponsored projects to improve the use of climate information for water related decision making. Prior to coming to APCC, she conducted research for climate change adaptation, vulnerability, and risk management at the Korea Adaptation Center for Climate Change, Korea Environment Institute. Her research interests include the use of geographic information system and remote sensing for hydroclimatology, climate impacts on water resources, climate change adaptation and disaster risk reduction. At APCC, she pursues research integrating GIScience and hydroclimatology, including the development of remote sensing-based drought measures for water resources managers. She has recently been working on several research projects improving the use of climate forecast information in disaster research including the development of machine learning models for drought forecasting for Indonesia, South Korea, Thailand, and Fiji integrating long-range climate forecast data and remote sensing data.

Dr. Daeha Kim



Dr. Daeha Kim has studied cutting-edge topics in the field of hydrology and water resources engineering. His research interests are drought analysis, catchment hydrology, hydro-economic analysis, remote-sensing and agricultural productivity, and water resources planning and management. He has published research articles in scientific journals and actively participated in major international conferences networked with leading hydrologists in worldwide. Dr. Kim was affiliated with the Utah Water Research Laboratory at Logan, Utah during his doctoral course and contributed to snowmelt runoff prediction and hydro-economic resources management in a semi-arid river basin in Utah. Since 2015 at the APEC Climate Center, South Korea, he has researched evapotranspiration-based drought monitoring in the United States and socioeconomic drought in South Korea in the context of climate change. He is now actively involved in an international project for crop productivity in Laos under high climatic risks.

Dr. Hyunrok Lee



Dr. Hyunrok Lee joined the APEC Climate Center (APCC) in December 2013 as a research fellow. He completed his Ph.D in Computer Science at Korea Advanced Institute of Science and Technology (KAIST), Korea in 2013. His research interests are information and network security as well as software performance engineering. Before joining APCC, he served researcher at Electronics and Telecommunications Research Institute (ETRI), Korea government-funded research institute. He had been developed various information systems and its security mechanisms during his term of researcher of ETRI and Ph.D candidate of KAIST. Now he is the leader of the Information Service Team in APCC who is responsible for APCC's operation and management of Climate Information Service and development of Climate Information Service Platform. Utilizing his expertise and experience, he would like to be contributing to systematical design and effective implementation of ASEAN Science-based Disaster Management Platform (ASDMP).

Dr. Seungsoo Lee



Dr. Seungsoo Lee is a Research Fellow at the APEC Climate Center (APCC) over 8 years of experience in urban flood modelling. He received the PhD from Kyoto University in Japan in 2013 with the topic of development of integrated urban inundation model incorporating drainage systems based on physical experiments. Before joining the APCC, he worked at Pennine Water group of University of Sheffield, UK as well as at Disaster Prevention Research Institute (DPRI), Japan, on urban inundation modelling, interaction effects between surface flow and sewer pipe flows.

Dr. Lee's main research topics include urban drainage process, hydrology and hydraulic modelling, computational fluid dynamic, real-time inundation forecasting and early warning in urban area. He has developed a series of hydraulic models for urban flood simulations based on physical experiments. The current projects he is working on are the development of real-time urban inundation forecasting system using remote sensing techniques and the ASEAN Science-Based Disaster Management Platform. He is currently the member of the Urban Flood Modelling and Risk Management Working Group of the IAHR/IWA Joint Committee on Hydroinformatics, the member of Climate Working Group (ClimateWG) of APAN, and a Open Panel of CHY Experts (OPACHE) of Commission for Hydrology (CHy), WMO.

Dr. Boksoon Myoung



Dr. Boksoon Myoung is a Research Fellow at APEC Climate Center (APCC). She received a Ph.D. degree in Atmospheric Sciences from the Texas A&M University in 2007. Afterward, she worked at Georgia Institute of Technology as a postdoc fellow, and at Ewha Womans University and Chapman University as a research professor. With her research experience and intimate knowledge in Hydro- and Bio-meteorology, Dr. Myoung has placed her research focus on three broad interconnected themes: climate variability, extreme weather events, and related impacts on terrestrial ecosystems and human systems. Currently, she is actively working on drought mechanisms, water resource, and wildfire risk analysis based on interdisciplinary approach.

Dr. Sun-Kwon Yoon



Dr. Sun-kwon Yoon is a research fellow of Climate Application Team at APEC Climate Center, Busan Korea. He studied in department of civil engineering at the University of Seoul during Bachelor's degree and completed Master's and Doctoral degrees emphasis areas in hydrology at the same University. After receiving a Ph.D., he worked at Korea Advanced Institute of Science and Technology (KAIST) as a postdoctoral research fellow. His research interest areas are climate change, hydroclimate variability and its local impacts, statistical and hydrological modeling, hydrologic forecasting, flood and drought risk assessment, and integrated water resources management.

Dr. Yoon has experience of various projects in the field of hydrology. As a co-principle investigator, he has been leading a 5-year project named "Development of advanced techniques in combined inland-river systems for reducing urban inundation" and has been a 2-year project named "Development of a 3D simulation technique for landslide forecasting in urban areas and its integrated management system". The project aims to prevent and mitigate damage from flood inundation, debris flow, and landslide in urban areas. The research was supported by Ministry of Land, Infrastructure and Transport (MOLIT), Korea. In addition, Dr. Yoon involved in international projects, which are development of smart groundwater management system in the Kingdom of Tonga and the science based disasters risk reduction in ASEAN region, supported by Korean government.

Dr. Yoon has published more than 35 manuscripts in peer-reviewed journals and several technical reports on water resources area including climate change impact study, and he honored outstanding paper awards from water-related societies. As a further recognition of his scientific contribution, Dr. Yoon holds membership and served as a reviewer on Water Resources Management in the International Association on Hydrological Sciences (IAHS), the Korea Water Resources Association (KWRA), and the Korean Society of Civil Engineers (KSCE).

Ms. Sangwon Moon



Ms. Sangwon Moon joined APCC in May 2011. She, as the Head of External Affairs Department, is in charge of project and research contract and management as well as networking with APCC's international advisory bodies and international organizations. She holds a bachelor's degree in English Language and Literature from Pukyong National University and completed a Master of International Areas Studies from the same university. Prior to joining APCC, she worked at Pukyong National University for 7 years. She worked at the Office of International Relations as an international program coordinator since 2006 and was in charge of various international educational programs. In 2006-2007, she was also dispatched to Asia-Pacific Regional Office based in Manila, the Philippines where she expanded university's global network to the Asia Pacific region closely working with international organizations, universities and educational institutions. She was awarded Fulbright Scholarship in 2009 for Fulbright International Administrators Program which gave her rich experiences to interact with educational and private organization personnel to become acquainted with the philosophy, organization and management of international programs.

Ms. Suhee Han



Ms. Suhee Han joined APCC as a staff of External Affairs Department in July 2011. She contributed to the field of organizing and managing training programs and project development and management at EAD. She completed her master degree in Environmental Engineering at Pukyong National University in 2009. She worked as a research assistant for eco-hydrology model and watershed management studies during her graduate study. She built her experience from the GEF as an intern of climate change team and as a staff at the Ramsar Regional Center – East Asia based in Gyeongnam Province, Korea. She is now in charge of APEC Climate Symposium and Young Scientist Support Program in APCC while works for networking with APCC's international advisory bodies.

Ms. Bo Ra Kim



Ms. Bo Ra Kim joined APCC in October 2015 as the International Project Officer in the External Affairs Department. She graduated from Columbia University with an MPA in Environmental Science and Policy and from Bates College with a BA in Environmental Economics and Music Composition. She was awarded a Jack Kent Cooke Scholarship continuously from 2005 to 2015. Prior to joining APCC, she served as the Chair of the Executive Committee of the Sierra Club's national youth chapter in the United States. She also worked on the US Environmental Protection Agency's "Trash Free Waters" collaboration project as a part of her MPA capstone to quantify the financial costs of managing marine debris in the Hudson-Raritan Estuary in 2015. Ms. Kim is mainly responsible for facilitating international cooperation projects at APCC.

APCC Projects in Disaster Management

Climate Information-based Water-Agriculture Risk Assessment in Thailand

Jaepil Cho, Uran Chung, Boksoon Myoung, Jihyun Oh, Kyung Won Park, and Jinyoung Rhee

Due to frequent occurrences and severity of hydro-meteorological disasters such as floods and droughts in Thailand, the need to better comprehend and anticipate the impacts of climate variability and climate change on water shortages and subsequently agriculture has become increasingly urgent. Climate information, including subseasonal (upto a month) to seasonal forecasting (upto 6 months) and climate projection, can be employed to address this need. The proposed project called "Climate Information-based Water-Agriculture Risk Assessment" (Cli-WARA, hereafter) aims to enhance adaptive capacity and build new tools to better equip decision-makers by increasing understanding of the impacts of climate variability and change on water and agriculture systems and delivering key trainings. In more detail, this one-and-half-year project (Jan, 2017 – Jun, 2018) is designed to 1) investigate impact of various scales of climate variability and change on water resources in Thailand, 2) assess rice productivity under employment of climate information, and 3) develop a drought/flood risk assessment and management framework. The project is unique in performing multi-disciplinary study incorporating various expertise such as climate science, agriculture, hydrology, and remote-sensing technology as well as in applying a new forecast product, subseasonal forecasts, to application fields (e.g., agriculture and water resource). The results in the first year highlight usefulness of not only seasonal forecast but also subseasonal forecast in 1) predicting monsoon start, droughts and rice productivity, and, therefore, 2) developing climate information-based risk assessment and management framework in Thailand. These results are expected to understand climatic risk for agriculture and water resources in Thailand and to improve their adaptive capacity and decision-making processes.

Development of smart groundwater management system in the Kingdom of Tonga: utilizing climate information in response to shortage of water

Dr. Sunkwon Yoon

The importance of securing water resources and safe drinking water is of utmost in the Pacific islands in a changing climate. Given there are no large catchment areas and lack of fresh water supply systems in Tonga, identifying available water resources and storing them are one of the top priorities. The supply and demand of water resource in Tonga is regionally biased and the quantity and quality of it are at high risk due to the pollution and depletion of surface water as well as seawater intrusion. All these facts affect Tonga, putting it in a very vulnerable status in obtaining sustainable water resources. The APEC Climate Center (APCC) and the Ministry of Lands, Survey and Natural Resources (MLSNR) have joint project to develop a smart groundwater management system for utilizing climate information in response to shortage of water in the Kingdom of Tonga.

The project aims to support the stakeholders and decision-makers in Tonga's water resources sector to sustainably secure water resources by providing optimal alternatives to the current system. This is one component out of three to be implemented in the next 3 years (2016-2018). APCC analyzed Tonga's climatology, climate change impact, and water recharge for the island of Tongatapu. APCC also installed the real-time monitor groundwater observation system and developed the web-based model for analyzing and predicting the sustainable use of underground water resources by collaborating with the HydroNet company team and the Dong-A University team. Through this project, the integrated groundwater information system based on web geographic information system (GIS), which is Tonga Groundwater Information System (ToGWIS, <http://210.125.181.22/>), was developed. This will enable better advice to water managers and public on water usage for daily use, agriculture, and industry during events such as El Nino and extreme drought, etc. Based on this project, Tongan government is expected to be able to establish a strategic plan for sustainably securing water resources in response to climate change and its variability. In addition, the quality of life and the water security of local communities are expected to increase due to the optimal solutions to future water demand by using this smart groundwater information system.

Sensitive Effectiveness of a Structural Adaptation for Reservoir Systems to Climatic Stresses

Dr. Daeha Kim

Reservoirs have played a crucial role in sustaining agricultural production and human livelihood. Though expanding reservoir capacity is deemed a robust structural adaptation, almost no studies have discussed the sensitivity of its adaptation effectiveness to climatic stresses. This study investigated the effectiveness of building or upsizing reservoirs on reducing water scarcity in a simple reservoir system under climate change. A sensitivity-based framework was employed to combine a stochastic system analysis and climate projections for assessing mean water scarcity under various climatic stresses. Results showed that building or upsizing the reservoir made mean water scarcity more responsive to climatic stresses. While additional reservoir capacity could generally reduce the mean water scarcity, effectiveness from the structural approach was expected to diminish rapidly under a high greenhouse gas emission scenario. The reservoir system should become a run-of-river dam to meet water demand irrespective of its storage capacity under extremely dry conditions generating minimal inflows. This indicates that water availability gained by additional storage capacity should decrease rapidly to converge on the none-effectiveness. Even though the extreme dry conditions are unlikely to be realized, the convergence determines the sensitivity of system performance to climatic stresses. This study suggests that a small climatic stress can trigger more significant performance losses than before the structural adaptations.

Development of Real-time Urban Inundation Forecasting system using remote sensing information

Dr. Seungsoo Lee

In recent years, we are suffering abnormal weather condition due to climate change around the world. The abnormal weather condition intensifies extreme rainfall events, so that urban flooding and inundation caused by extreme rainfall events are frequently occurring. Once it happens, the damages are very huge and severe because most properties and people are concentrated in urbanized area. Therefore, countermeasures for flood defense are urgent task.

In this research, study on real-time urban inundation prediction system using predicted precipitation data based on remote sensing technology is conducted. Grid based mesh refinement method is applied to simulate surface flow and combined with 1D sewerage analysis model to consider interaction phenomena between surface and sewer system. Also parallel computing method, OpenMP, is applied to reduce calculation time. The selected models are estimated by applying to 25 August 2014 extreme rainfall event which caused severe inundation damages in Busan area in Korea. In addition, Oncheoncheon basin is selected for study basin and observed radar data are assumed as predicted rainfall data. 10m×10m resolution grid mixed with 5m×5m resolution grid is used for mesh refinement model. 5m×5m grid was used to depict road network in urban area.

As the results of validation using observed data, simulation result shows acceptable maximum inundation depth with propagation phenomena with reasonable inlet effects into storm drains at mountain area and overflow effect onto surface in urbanized area because mesh refinement method can depict well distribution of storm drain on the road. Therefore it is expected that this results can be used for real time urban inundation forecasting to minimize damages.

