



FLOOD & DROUGHT MANAGEMENT TOOLS

2nd Flood and Drought Symposium Report

6 June 2018

United Nations Convention Centre
Bangkok, Thailand



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1. Executive summary

There is a growing sense of urgency around the need to improve resilience within river basins, and for this to become a critical part of water management plans. The increased frequency and unpredictability of floods and droughts is a priority concern across scales from transboundary to local, along with the other multiple drivers that cause depletion and degradation of shared water resources.

The Flood and Drought Management Tools (FDMT) project (<http://fdmt.iwlearn.org/>) is financed by the Global Environment Facility (GEF) International Waters (IW) and implemented by UN Environment, with the International Water Association (IWA) and DHI as executing agencies. The project developed the Flood and Drought Management Tools portal, with tools to support planning from the transboundary basin to water utility level by including better information on floods and droughts. The project is being implemented from 2014 - 2018, with testing and validation in 3 pilot basins Volta, Lake Victoria and Chao Phraya.

The FDMT project organised a 1 day symposium: “2nd Flood and Drought Symposium: Using a Decision Support System for Informed Decision Making” on June 6th, 2018. The symposium, which was co-hosted by the Hydro and Agro Informatics Institute (HAII), the Metropolitan Waterworks Authority (MWA) and Provincial Waterworks Authority (PWA), provided a forum for institutions to showcase and discuss the national vision on flood and drought management from different perspectives. It enabled participants to share their strategies and approaches to effectively prepare and respond to current and future challenges within the context of climatic variability and change. The event took place at the United Nations Convention Centre in Bangkok, Thailand.

The main objectives of the symposium was to share past experiences and the future vision for managing water resources in Thailand in the face of extreme events such as floods and droughts, to help raise awareness and ownership of the Flood and Drought Portal applications as a mechanism to address current and future water challenges, and to officially present the completed Flood and Drought Management Tools to Thai stakeholders a tool which can be used across the Chao Phraya Basin.

Through presentations and panel discussions, the symposium highlighted the national vision on flood and drought management as well as international perspectives on flood and drought management. A panel with representatives from Thai institutes opened discussions around flood and drought impacts on water security. The symposium also drew from the perspectives of key project partners and stakeholders, looking at the past experiences and future challenges and how ICT solutions, such as the Flood and Drought Portal, is helping to enhance planning across all levels of water management.

An overview of the event is available on the project website with access to the presentations: <http://fdmt.iwlearn.org/events/2nd-flood-and-drought-symposium-chao-phraya>.

2. Project background

The Flood and Drought Management Tool (FDMT) project is funded by the Global Environment Facility (GEF) International Waters (IW) and implemented by UN Environment, with DHI and the International Water Association (IWA) as the executing agencies. The project is being implemented from 2014 - 2018, with 3 pilot basins (Volta, Lake Victoria and Chao Phraya) for testing and validating the methodology and technical applications.

The project responds to a growing sense of urgency around the need to improve resilience within river basins, and for this to become a critical part of water management plans. Consequently, the International Waters (IW) focal area of the GEF identified the increased frequency and unpredictability of floods and droughts as a priority concern in transboundary contexts, along with the other multiple drivers that cause depletion and degradation of shared water resources.

Based on these issues, the project is developed a decision support system (DSS) that supports the integration of information on floods and droughts into planning across scales including Transboundary Diagnostic Analysis (TDA) and Strategic Action Programmes (SAP), and Integrated Water Resources Management at the basin level and Water Safety Planning (WSP) and the local (water utility) level.

The DSS or Flood and Drought Portal is a freely available web-based system containing a package of technical applications (<http://www.flooddroughtmonitor.com/home>). The portal has been tested and validated with available data at both basin and local levels in the 3 pilot basins; however it will be available for all transboundary basins.

3. 2nd Flood and Drought Symposium



Participants during the 2nd Flood and Drought Symposium (source: Ministry of Science and Technology)

3.1 Overview of the symposium

A 1 day symposium: “2nd Flood and Drought Symposium: Using a Decision Support System for Informed Decision Making”, co-hosted by the Hydro and Agro Informatics Institute (HAI), the Metropolitan Waterworks Authority (MWA) and Provincial Waterworks Authority (PWA), was organised by the FDMT project in Bangkok, Thailand on the October 6th, 2018. The aim of the symposium was to provide a forum for institutions to showcase and discuss the national vision on flood and drought management from different perspectives. The symposium also gave the opportunity to discuss strategies and approaches being used to effectively prepare and respond to current and future challenges. The agenda can be found in Annex 1.

The key objectives of the symposium were to:

- Share past experiences and the future vision for managing water resources in Thailand, in the face of extreme events such as floods and droughts.
- Raise awareness and ownership of the Flood and Drought portal applications as a mechanism to address current and future water challenges.
- Officially present the completed Flood and Drought Management Tools to Thai stakeholders and how the outputs can be used across the Chao Phraya Basin.

This symposium showcased and discussed the national vision on flood and drought management from different perspectives, and through the experience of project partners and stakeholders the strategies and approaches to effectively prepare and respond to current and future water challenges.

3.1.1 Target group

The target group of this event were organisations and individuals working on addressing the impacts of climate change, with a focus on the water sector. Participants were high level representatives from water utilities, government agencies, research institutes, the ICT sector and NGOs. A full list of participants can be found in Annex 2.

3.2 Using a Decision Support System for Informed Decision Making

As climate change takes hold, more flooding events are likely. These may result from more intensive rainfall or poor management and planning of water resources. Despite the cause, the impacts are equally devastating. Mr. Jerker Tamelander's (UN Environment) welcome remarks demonstrated the devastation. He referenced a UN report (UNISDR) showing that in the last 20 years, 157,000 people have died as a result of floods. The report also says that between 1995 and 2015, floods affected 2.3 billion people, which accounted for 56% of all those affected by weather-related disasters. While droughts do not appear as immediate as floods, they have equally, if not more devastating impacts. A recent study showed droughts were responsible for more deaths than any other extreme weather event. Droughts have also been blamed for increasing global rates of soil degradation, deforestation and human migration.

Tamelander continued to say that we are fortunately not completely vulnerable. If people are prepared, they are much more resilient to natural disasters. Knowing the global hotspots of flood and drought risk, and quantifying this risk, can ensure there is information that can warn and prepare communities to handle the worst climate-related events that come their way.

The high prevalence and severity of flood and drought events on water resources, human communities and ecosystems, demonstrates the growing need to building resilience against such events. Ensuring access to adequate hydrological and climate information can improve our ability to properly prepare and plan appropriate management techniques as a method of protection. In fact, there is increasingly sophisticated smart water management tools which allow water managers to access information on current and forecasted climate conditions. This has been an area of interest for UN Environment along with the Global Environment Facility, to ensure scientifically sound climate information is incorporated into planning across scales. The Flood and Drought Management Tools project, is an example in which basin beneficiaries are able to tap into available data sources through an online portal which enabling access to data and information to inform planning and management of water resources within the context of climate variability and change.

Associate Professor Soranit Siltharm from the Permanent Secretary of Ministry of Science and Technology in his [opening remarks](#) further emphasised how at present, flood and drought problems are intensifying. On the one hand, this is due to continued changes to the climate, but also due population growth and the rapid growth of economic conditions influencing land use change and water demand. He went on to stress the importance of using science and technology in water management to maximise the benefits. Normally, Thailand has an average rainfall of 1,467mm per year. In the year 2017, they saw 1,829mm of rainfall, which exceeded the normal level by 25%. This figure is close to the amount of rainfall experienced in 2011, when Thailand experienced its devastating flood. Because of the information and advanced technology used in water management, they were better prepared to manage the situation and make better decisions.

3.2.1 Flood and Drought Management Tools

Recognising the growing frequency, unpredictability and severity of flood and drought events, the Flood and Drought Management Tools (<http://fdmt.iwlearn.org>) is developing online technical applications to support planning from the transboundary basin to water utility level by including better information on floods and droughts. The project is being implemented from 2014 – 2018, with 3 pilot basins (Volta, Lake Victoria and Chao Phraya) participating in development and testing of the methodology and technical applications. An [overview](#) of the project was presented by the executing agencies of DHI and IWA.

3.2.2 Flood and drought management (national and international vision)

Thailand has experienced its fair share of flood and drought events, with impacts felt across sectors. Dr. Somkiat Prajamwong, the Secretary General for the Office of the National Water Resources (ONWR) explained in his [presentation](#) the significant economic and environmental impacts of the severe flooding of in 2011 and the drought of 2016. The Drought of 2016 resulted in average rainfall

dropping to 46% lower than normal, water levels decreased by 45% of the whole reservoir capacity. At the same time, rain-fed rice plantations suffered, impacting local farmer's livelihoods.

It comes as no surprise that the experience of 2011 or the severe droughts of 2016, influenced flood and drought management and planning practices in Thailand. The lessons learned provoked a need for institutional changes. To improve water management and ensure integrated cooperation between different agencies, the Office of National Water Resources (ONWR) was established with the following mandate: "Support the strengthening of transparent, effective, inclusive and accountable national and, where appropriate, subnational water institutional arrangements, with participation of all relevant stakeholders and consideration of local circumstances in the policy-making process, while fostering necessary partnerships, confidence building, exchange and sharing of information and experiences among public, private and civil society actors".

The new set up aims to influence the future water resources management approach for Thailand, hinging around 3 mechanisms: policy (e.g. Water Resources Management Strategy 2015-2026), organisational set up for management of water resources and legislation (Water Act and Ministerial Regulation).

The future vision considers public involvement and opinion, improvement of Thailand's ICT capacity, and sharing knowledge and learning from experience both nationally and internationally.

On the international stage, the [Sendai Framework for Disaster Risk Reduction](#) has been adopted by Thailand as a framework to reduce the risks associated with extreme events. The framework aims to reduce the risk and loss of lives livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries due to disasters. While the framework recognises that countries have the primary role to reduce disaster risk but that responsibility should be shared with other stakeholders including local government, the private sector and other stakeholders. Dr. Animesh Kumar, the Deputy Chief of UNISDR for the Asia and Pacific region, provided an [overview](#) on implementing the Sendai Framework in the context of flood and drought risk management.

3.2.3 Addressing flood and drought impacts on water security

A panel discussion on addressing flood and drought impacts on water security was moderated by Dr Surajate Boonya-aroonate from HAIL. This was then followed by discussion around a number of guided questions outlined below:

General (to all)

- How are extreme events such as floods and drought affecting your operations?

Mr. Vutinun Pothongnark, Provincial Waterworks Authority (PWA)

- How are you preparing and planning for drought/water scarcity and flood events? What information is needed and how do you access it?

Mr. Somboon Sunanthapongsak, Metropolitan Waterworks Authority (MWA)

- How are you preparing and planning for drought/water scarcity and flood events? What information is needed and how do you access it?

Mr. Worapoj Worapong, Electricity Generating Authority of Thailand (EGAT)

- How do extreme events affect power generation? How do you plan for sufficient water for hydropower with other users such as RID?

Dr. Phattaporn Mekpruksawong, Royal Irrigation Department (RID)

- This year there has been some flooding in Thailand?
- How does this impact agricultural production?
- How does RID ensure there is sufficient water for agriculture and other users (energy, drinking water), etc.?

PWA is a state enterprise under the Ministry of Interior supplying water across the country with 234 branches. Surface water catchment areas are spread across the country and are the main source of water, however there is limited use of groundwater and seawater. The quality of water supplies has a great impact on operation and image as well as expected on providing supply to consumers. There is limited access to quality data in some areas that PWA cover, which can have negative impacts on efficiency. When droughts occur the problem is that the water in the lower part of some reservoirs has reduced dissolved oxygen which can impact water quality. In 2015 prolonged drought, PWA had to allocate financial resources to respond to reduced water supply by measures such as water transfers. With flooding, water logging occurs and consequently leads to poor water quality.

Most of the drinking water that supplies Bangkok is from the Chao Phraya River. During flooding events, there are significant impacts on water supply. Flash floods and landslides experienced in 2006 resulted in high turbidity levels, impacting the production rates of water as well as increasing the cost of production. The major floods in 2011 saw a drop in water quality, impacts to production rates and major costs for rehabilitation between the years 2012 and 2016. The drought experienced saw increased levels of salt intrusion as well as microalgae bloom which had significant implications on water production and infrastructure.

For MWA, efforts were made to improve their capability to control or respond to the situation, looking at options for prevention, improving preparedness, response and recovery to extreme events, which involved both access to information and stakeholder engagement. PWA, who is in charge of supplying water to remainder of Thailand, accesses water through various sources in the catchment, including surface and ground water, and the occasional used of sea water. The quality of raw water influences their operation and ensuring the supply of good quality water is important for their image and ensure customer trust. During extreme events, there are many impacts which present challenges in maintaining their water service provision. Access to data (quality data) is limited in some remote areas, and limited budget to address the impacts of climate change have significant consequences on their operation.

Dams provide a large part of Thailand's energy production and irrigation systems. Fluctuating levels in dams due to forced releases during the rainy season and low levels during the dry season has serious implications on energy production and availability of water for crop production. EGAT addresses this issue by monitoring the water levels, looking at both inflows and outflows. Using forecasted data, the ability for EGAT and RID to plan for possible wet and dry periods is made possible.

Knowing the storage levels helps to prioritise water management across the following areas:

- Water allocation for consumption (in dry season)
- Water allocation for ecosystem (in dry season)
- Water reservation for beginning of rainy season
- Water allocation for agriculture
- Water allocation for industry

To alleviate drought impacts, RID has put in place a number of measures including awareness raising, encouraging alternative income generating activities during dry spells, optimising the use of water. Such approaches can influence the water levels in dams. With respect to flooding, there are several measures being implemented as part of a flood management strategy, including increasing draining capacity, flood diversion and detention areas, ensure the full potential use of storage areas, as well as more social measures such as adaptation and escape options for communities.

3.2.4 Water resources and flood management: Past experiences and future challenges

Aside from the establishment of the ONWR to address extreme events in Thailand, Dr. Sutat Weesakul, Director of HAI, explained in his [presentation](#) that the floods of 2011 led to the establishment of the National Hydro Informatics and Climate Data Centre (NHC). The NHC would enhance the early warning and real-time decision making options for Thailand by integrating technology for data analysis and flood management. The information from the NHC is used by the ONWR for decision making. HAI is one of the 35 government agencies of ONWR, contributing and making use of the NHC.

Weesakul added that the Flood and Drought Portal is providing additional data, including flood and drought indices, seasonal forecasting and climate change data, which can be used for flood and drought monitoring and planning in Thailand. The short- and long term projects can help improve planning and management by providing location and intensity of future rainfall, useful to indicate the possibility of a flood or drought event. The risk areas can be identified and monitored in order to prepare better measures and response. HAI currently uses this information to develop a drought report looking at rainfall information, computed data such as NDVI (vegetation coverage) and SWI (soil moisture), and SPI as a drought index to monitor and indicate risk area of a drought.

Since the floods, HAI has received support in developing the Flood Forecast System under the NHC from DHI, explained Oluf Jessen, Head of Project with DHI in his [presentation](#). The support involved activities around capacity building and training, transfer of technology for flood modelling, water resource assessment and decision support, all to build and maintain local experience and knowledge of the highest level within the areas of flood and water resource assessment.

At DHI, there is a level of confidence in that ICT will develop in the years to come, which will mean improvements in the way we can manage water resources, the way in which we can forecast and manage floods and droughts. Operational decision support systems, supporting water management, will become seamless across times scales and data engines as operational services will exist on the cloud, making their accessibility even easier.

3.2.5 Water supply issues and the Flood and Drought Management Tools

With the increasing frequency of flood and drought events, and the severe impacts on water quantity and quality. Significant effort is therefore placed on ensuring continued supply of safe water and ensuring customer confidence explained Mrs. Siwilai Kitpitak in her [presentation](#), a water expert with MWA. Water Safety Planning (WSP) has presented MWA with a framework to realise its ambitions. WSP is a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer: catchment, treatment and distribution.

In the case of many water utilities, there is little control or engagement with the wider catchment and measures to address issues around water quality and quantity often focus on the intake with an emphasis on treatment. WSP looks beyond the area of control and aims to guide the utility to look at how to manage hazards and risks that occur from catchment to tap which impact the water supply.

While MWA has been implementing risk-based approaches to water supply management, it is not formally recognised as WSP. It was only in 2013 that a team was set up to study how to implement WSP and formally launch the approach.

Katharine Cross, Programme Manager with IWA [presented](#) on the WSP supporting application as part of a package of technical applications that sits within the Flood and Drought Portal developed under the Flood and Drought Management Tools project. The application supports the 11 modules in the WSP manual each representing a key step in development and implementation of WSP. The application enables utilities to document and share their WSP within the team and prompts utilities to consider climate change impacts on their supply system. Through the use of other applications, such as the Data and Information application, water utilities are able to access climate information. This information ensures climate impacts are considered in the implementation of WSP, particularly in relation to hazards and risks.

MWA has been one of many key beneficiary of the application, supporting the testing and validation of the application to ensure its relevance and applicability. Through the applications in the Flood and Drought Portal (including the other available applications) the projects hopes to support utilities better prepare for climate hazards, and ensure safe and secure water supply through the implementation of a more appropriate and robust WSP.

3.3 Conclusion

In 2015, the 1st Flood and Drought Symposium was held at UNCC co-hosted by HAI, DHI, IWA and Cap-Net. The event convened more than 150 people over 1 day with the purpose of enhancing the

levels of understanding around the inclusion of information about floods, droughts and future scenarios into planning across scales. The Flood and Drought Management Tools project was introduced as an approach to support such planning.

Since the 1st Symposium in 2015, considerable progress has been made in the project from the first developments of the planning tools to a functional freely available Portal with a number of online applications which allow access of data and information, assessment of flood and drought risks, planning options, and dissemination through reports.

Flood and drought events will persist both in Thailand and internationally. These events will become more severe, more frequent and less predictable. The Flood and Drought Portal described in the symposium is providing relevant applications to better inform management of water resources. For example, the Data and Information application provides relevant climate data and indicators to assess the flood and drought situation for the Chao Phraya Basin.

The 2nd Flood and Drought Symposium is a good reflection of the continued efforts and commitment of both Thai institutions and the international community to address the impacts of climate change through sharing of experiences, technologies and information/knowledge. HAIL, MWA, PWA and other national water institutions in Thailand will continue to take advantage of the smart water management tools, such as the Flood and Drought Portal, to better prepare, plan and respond to climatic hazards including flood and droughts.

Additional information

- Press release: <http://www.iwa-network.org/press/a-resilient-drought-and-flood-management-approach-in-the-chao-phraya-thailand/>
- Streaming of symposium: <https://www.youtube.com/watch?v=Aqh16P8Pgi8&feature=youtu.be>
- Article: <https://www.dhigroup.com/global/news/2018/06/new-online-portal-for-flood-and-drought-management-now-live>
- Interview with HAIL: <http://fdmt.iwlearn.org/news/progress-yes-but-we-still-have-much-to-learn>
- Thai media
 - <https://www.youtube.com/watch?v=jAjHQ-dLiZ0&feature=youtu.be>
 - <http://www.most.go.th/main/th/news/34-news-gov/7329-flood-and-drought-management-tools-fdmt>
 - <http://news.ch3thailand.com/local/70665>



(Source: Ministry of Science and Technology)

Annex 1 – Agenda

Time	Item
08:00 – 08:45	Registration
09:00 – 09:15	Welcome remarks <ul style="list-style-type: none"> Mr. Jerker Tamelander, UN Environment
09:15 – 09:40	Opening remarks and keynote <ul style="list-style-type: none"> Associate Professor Soranit Siltharm, Permanent Secretary of Ministry of Science and Technology
09:40-09:45	Photo session
09:45-10:10	Break
10:10-10:15	<u>Presentation</u> Flood and drought management tools - Project vision <ul style="list-style-type: none"> Ms. Katharine Cross, Programme Manager, International Water Association
10:15 – 10:30	<u>Presentation</u> Flood and Drought Management Tools – Project Overview <ul style="list-style-type: none"> Mr. Bertrand Richaud, Inland Waters, DHI
10:30 – 11:00	<u>Presentation</u> <ul style="list-style-type: none"> National vision on flood and drought management Dr. Somkiat Prajamwong, Secretary General, Office of the National Water Resources (ONWR), Office of the Prime Minister International vision on flood and drought management Dr. Animesh Kumar, Deputy Chief, UNISDR Asia and Pacific <p><i>Chair: Ms. Katharine Cross, IWA</i></p>
11:00 – 12:00	<u>Panel discussion</u> Addressing flood and drought impacts on water security <ul style="list-style-type: none"> Mr. Vutinun Pothongnark, Assistant Governor (Technical Affairs), Provincial Waterworks Authority (PWA) Mr. Somboon Sunanthapongsak, Deputy Governor of Water Production and Transmission, Metropolitan Waterworks Authority (MWA) Mr. Worapoj Worapong, Electricity Generating Authority of Thailand (EGAT) Dr. Phattaporn Mekpruksawong, Senior expert - Civil Engineering, Royal Irrigation Department (RID) <p><i>Chair: Dr Surajate Boonya-aroonnate, HAIL</i></p>
12:00 – 13:00	Lunch
13:00 – 14:00	<u>Presentation</u> Water resource and flood management– past experiences and future challenges (using the Flood and Drought Management Tools) <ul style="list-style-type: none"> Dr. Sutat Weesakul, Director, HAIL Mr. Oluf Zeilund Jessen, Head of projects, Water Resources, DHI <p><i>Chair: Dr. Somchai Chonwattana, DHI</i></p>
14:00-15:00	<u>Presentation</u> Water supply issues and challenges (using the Flood and Drought Management Tools) <ul style="list-style-type: none"> Ms. Katharine Cross, Programme Manager, International Water Association Mrs. Siwilai Kitpitak, MWA Expert, level 8, Office of Assistant Governor of Planning, MWA <p><i>Chair: Dr. Lalita Rammont, IWA</i></p>
15:00-15:15	Close Symposium <ul style="list-style-type: none"> Dr. Sutat Weesakul, Director – HAIL
15:15-15:45	Refreshments, networking and visit the exhibition

Annex 2 – Participants List

First Name	Family Name	Organisation
Project staff		
Bertrand	Richaud	DHI
Oluf	Jessen	DHI
Katharine	Cross	IWA
Lalita	Rammont	IWA
Romaneeya	Mather	IWA
Participants		
Hans	Guttman	ADPC
Chula	Chanmuang	All Siam Trading Co.
Jaroongkiat	Pootirat	All Siam Trading Co.
Sunaree	Medrala	All Siam Trading Co.
Assanai	Panyamang	Channel 3
Natee	Suntonpun	Channel 3
Racharpon	Dacharboon	Channel 3
Nattaya	Kachintorn	Dailynews
Sarote	Thiprut	DDPM
Pasan	Kulvanit	Dept of Science Serv
Somchai	Chonwattana	DHI
Varaporn	Buranautama	DHI
Ekarach	Boonlomrug	DOAE
Khanitha	Phongpreecha	DOAE
Sirada	Timprasert	DOAE
Kittirat	Kerdsamang	DPT
Rattikarn	Khambud	DPT
Parinya	Intaracharoen	DRRAA
Sinchai	Pungtambol	DRRAA
Janya	Trairat	DWR
Jatupong	Paiboonrojana	DWR
Khunphot	Buatone	DWR
Naree	Intharawichian	DWR
Onanong	Srikua	DWR
Tipawan	Khuntong	DWR
Traithit	Kirichot	DWR
Chaityuth	Jarupattananon	EGAT
Wanpen	Kaewkaemthong	EGAT
Worapoj	Worapong	EGAT
Chanakan	Jaturachat	EGAT
Lailphat	Leelaphat	EGAT
Pasaraporn	Sorujjatanondh	EGAT
Pawin	Chinnakarn	EGAT
Phurinat	Yodpratum	EGAT
Caroline	Turner	FAO
Louise	Whiting	FAO
Jittiporn	Chantarojsiri	HAI
Kanoksri	Sarinnapakorn	HAI
Karnjana	Saengprapai	HAI
Natta	Ariyananthakul	HAI
Nunnaphat	Pisankanawat	HAI
Rati	Sawangwattanaphaibun	HAI
Royol	Chitradon	HAI
Sasiprapa	Tanyong	HAI
Srisuda	Sooksmarn	HAI

First Name	Family Name	Organisation
Supaluk	Wimala	HAI
Sutat	Weesakul	HAI
Tantima	Tungjaipongtham	HAI
Thippawan	Thodsan	HAI
Veerachai	Tanpipat	HAI
Vorawit	Meesuk	HAI
Apimook	Mooktaree	HAI
Atthanat	Khurat	HAI
Aungkana	Jinvong	HAI
Jutarat	Maneelok	HAI
Nares	Kheng-ngern	HAI
Narongrit	Luangdilok	HAI
Natchanon	Uraierkkul	HAI
Phiranant	Thajai Navamaratna	HAI
Piyamarn	Srisomporn	HAI
Sathit	Chantip	HAI
Siriphen	Jirapornmanee	HAI
Surajate	Boonya-aroonnet	HAI
Surajedt	Chalothorn	HAI
Theerapol	Charoensuk	HAI
Ticha	Lolupiman	HAI
Treeyarat	Pantabud	HAI
Watin	Thanathanphon	HAI
Mongkonkorn	Srivichai	JGSEE
Nosha	Assareh	JGSEE
Trang	Hoang	JGSEE
Montri	Maleewong	Kasetsart University
Tanuspong	Pokavanich	Kasetsart University
Watcharaporn	Soyjumpa	Kasetsart University
Hanisah	Musor	Kasetsart University
Chaveewan	Pattanapong	LDD
Ruj	Kasetsuwan	LDD
Saowaluck	Punfuk	MOST
Soranit	Siltharm	MOST
Chaweepan	Suangkiattikun	MWA
Nipon	Leelaruji	MWA
Parichat	Punthong	MWA
Siwilai	Kitpitak	MWA
Somboon	Sunanthapongsak	MWA
Chatsinee	Surasen	MWA
Titiya	Doungnak	MWA
Anon	Ruangrueang	National
Iyara Aravie	Braswstein	National
Pavarate	Jongjaroenrungruang	National
Pakorn	Wimulka	National News
Suchanee	Rungmueanpor	National News
Teppatat	Pantuphag	NECTC
Aim-On	Pruksuriya	NESDB
Boonchoob	Songtragoolsak	NESDB
Chuleeporn	Bunyamalik	NESDB
Monthip	Sriratana	NRCT

First Name	Family Name	Organisation
Dunyarit	Homnan	ONWR
Lerdphan	Sukyirun	ONWR
Somkiat	Prajamwong	ONWR
Somkiat	Apipattanavis	ONWR
Thitichayahn	Teerachayarwat	ONWR
Prangpisut	Suttharom	Panya Cons. Co.
Siriluk	Chumchean	Panya Cons. Co.
Chatchai	Jeamsripong	Phichit P.A.O.
Kim	Phiromphoo	Phichit P.A.O.
Nirun	Wongthanaphat	Phichit P.A.O.
Santi	Kanpakdee	Phichit P.A.O.
Anuvart	Wongwan	Phrae P.A.O.
Surapong	Martmontri	Phrae P.A.O.
Wirit	Kavayapanik	Phrae P.A.O.
Pattarada	Phonwariyasakun	PWA
Phuwanop	Khunaworapanya	PWA
Sompong	Puangtong	PWA
Vutinun	Pothongnark	PWA
Prueksa	Booncharern	PWA
Sakorn	Sumhiran	PWA
Tanita	Kiatkarun	PWA
Varittha	Thanasumbun	PWA
Phattaporn	Mekpruksawong	RID
Santi	Tem-lam	RID
Sanit	Homhual	Second Army Area
Surachin	Kanjanajitti	Second Army Area
Vatcharapol	Kanthar	Second Army Area
Phat	Pumchawsaun	Stockholm University
Intira	Sawetprawichkul	TEAM C.E.M. Co.
Kannika	Pahonepipat	TEAM C.E.M. Co.
Uruya	Weesakul	Thammasat University
Fatah	Masthawe	TMD
Patchara	Petvirojcahi	TMD
Pattara	Sukthawe	TMD
Aphantree	Yuttaphan	TMD
Pitt	Kongborrirak	TMD
Chatsinee	Surasen	MWA
Hanisah	Musor	Kasetsart University
Watcharaporn	Soyjumpa	Kasetsart University
Kriangkrai	Kampeera	Chulalongkong University
Patthama	Sangmee	HAI
Latan	Chaipreukkul	ONWR
Jaruwan	Poungrod	ONWR
Yuttana	Tanon	Channel 3
Sugrit	Kajonwaharth	DDPM