OFFICE OF THE NATIONAL WATER RESOURCES



The **management** of **Water Resources** in **Thailand**

"Lending a helping hand"

"...everyone has their own duty, but that does not mean that they are limited only to such duties. This is because if one is only limited to such specific duty and not be mindful of others, the tasks at hand will not move forward because all works are inter-related. Therefore, each individual must learn about the works of others and lend in a helping hand..."

Royal Quote of His Majesty King Bhumibol the Great

5 December 1990

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Chapter 1



Context of Thailand and the management of water resources

Thailand is a country with abundant water resources, making the livelihood of Thais connected to the rivers since the long past. Our ancestors used water sources as transportation routes and as sources of food. Up until the present, the water resources have become even more important towards the livelihood of the Thai people. This is not only in the use and consumption of water, but also water that is used in the agricultural and industrial sectors, which have an implication on economic and social security.

On the geographic information of Thailand, we can see that most of the area is located in the tropical zone near the equator, making most of the country's land area under the influence of stormy winds, from southwest to northeastern winds. Rainfall is frequent and there is enough of water for consumption and to supply the needs of various occupations. Across the country there are many water sources scattered in different areas, including large, medium and small water sources. They can be divided into 3 types, namely:

Types of water source

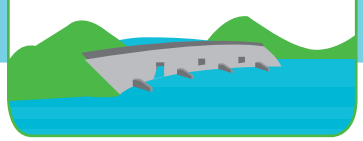
Rainfall

With the total national area, covering 22 river basins, of approximately 514,008 square kilometres or 321.2 million rai, Thailand's average rainfall is 1,455 mm/year. The rainfall variation varies area by area and range from 900 - 1,400 millemetres per year. This is considered to be a high supply of rainwater.



Natural flow

This is the amount of rainfall deducted by the water seeping into the ground or evaporated. The volume nationally is 285,227 million cubic metres. There are also 224,024 million cubic metres of runoff water aside from the natural flow water retained or used, which makes up 79% of the natural flow. The river basin with high volume of natural water is the Khong River Basin, while the river basins with lowest volume of natural water are Sakraekrang, Wang and Tonle Sap River Basins.



Water source from underground

Thailand possesses 27 underground water sources, with capacity to retain underground water totaling 1.13 trillion cubic metres. There is also 45.385 billion cubic metres of underground water that has the potential to be developed.



As for the situation of water demand in Thailand, it is evident that the demand is continuously high, corresponding to the economic expansion and population growth of the country. The latest data from 2015 showed that the overall demand for the whole country is 147,749 million cubic metres, which can be classified into 4 types of need as follows :

Water demand in Thailand

1 Water for agricultural use



This is considered to be the group with highest volume of water at 75% of all water used, in 32.75 million rai of irrigation land that is allocated 65 billion cubic metres of water per year. As for water used outside irrigation land, there are 117 million rai that uses a combination of rainwater, underground and natural flow water and the need is at 48.961 billion cubic metres.

2 Water for consumption and tourism

There is a need for 4.783 billion cubic metres of water, and it is forecasted that in 2037, the water needs will increase to 5.991 billion cubic metres in line with the growth of the services industry and tourism sector of the country. This is especially relevant in major cities in the regions of the country, such as Chiang Mai, Udon Thani and Songkhla provinces, the world famous destinations such as Bangkok, the Andaman coast and Samui Island, and the growth of tourism in the secondary cities on the western coast, such as Phetchburi, Prachuab Kirikhan and Chumphon provinces, in the northern region such as Chiang Rai, Phitsanuloke, and Tak provinces, in the northeast region such as Udon Thani, Nakon Rachasima, and Mukdahan provinces, in the central region such as Nakon Sawan, Chonburi, Rayong, and in the southern region such as Surat Thani, Songkhla and Phuket provinces.



3 Water for industry

In this sector there is a need of 1.913 billion cubic metres, and it is forecasted that in the year 2037, the need will reach 3.488 billion cubic metres. This is most relevant in areas with many factories and industrial estates, such as in Bangkok and nearby provinces, including in the eastern region which is country's main industrial area.



4 Water to preserve the ecosystem

There is a need of over 27.090 billion cubic metres of water to preserve the ecosystem during droughts.

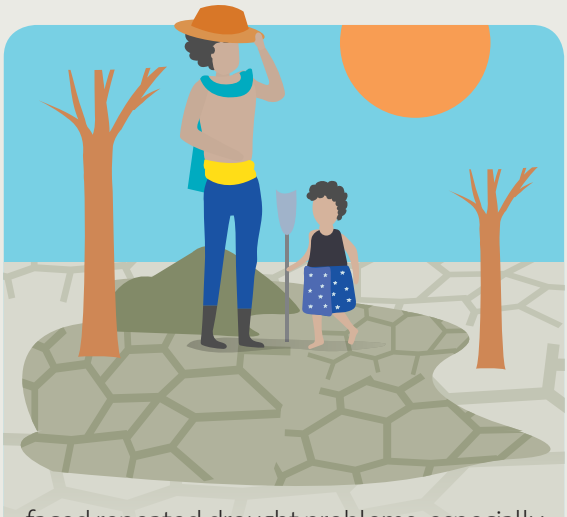


As we can see, the rapid economic and social growth and transition from an agricultural to an industrial society has continuously increased Thailand's demand for water use. Moreover, Thailand and other countries around the world have been affected by climate change and global warming, causing unpredictable volume of rain. In some years, there is too much rain causing floods, while in other years there is too little rain, causing droughts. This has created a risk in the use of national water resources. For example, the agricultural sector is able to access only 102.14 billion cubic metres of irrigation sources, and there are still farmers outside irrigation areas that need to use an additional 48.961 billion cubic metres of water.



Apart from this, many other risk factors were found that have an implication on water management, be it the problem from natural disasters or man-made disasters. Such problems, for example, are the encroachment of forests that are water sources and public water sources, the increase in population and expansion of urban areas, the development of economic zones, the expansion of industry, special tourism, the planting of crops that are not compatible with the soil and water, the building of obstacles to water flow, the release of polluted water to the rivers and canals, and the lack of reservoirs enough to retain water source as capital, thus creating negative effects on water sources in terms of quality and quantity.

From the past statistics of the past 40 years, Thailand has been faced with problems of drought or lack of water up to 12 times, and in each drought it has affected the income of farmers and caused economic damage to the country in agriculture and industry. Importantly, it was found that there were more areas that



faced repeated drought problems, especially in high risk areas and moderate risk areas that total 26.8 million rai. Moreover, the lack of water for consumption hit 75, 032 villages, while there were 256 villages with no water and 14,534 villages with broken or inefficient water systems.

Droughts have caused a problem in Thailand, and massive floods have also hit Thailand many times. Statistics back from 30 years have found that there have

been 13 major floods in Thailand that have caused damage to life, property and economy. For example, the great flood of 2011 caused economic damage up to 1.44 trillion baht. Areas of repeated moderate-level flooding have also been found, along with high-level flood areas totaling 10 million rai, including areas at risk of mudslides in 6,042 villages.

Beyond this, Thailand has found problems in quality of surface water, with only 29% of surface water that is good quality, 49% useable and 22% of deteriorating



quality in major national water sources. It is also of concern that in the past 10 years, there has been a tendency for Thailand to be faced with low quality water sources, with a decrease in good quality water sources and, in an opposite direction, an increase of deteriorating water sources. The cause stems from the high volume of wastewater from communities, of up to 10.3 million cubic metres per day. There is however, a wastewater treatment with a capacity of only 31% of all wastewater. Most of the wastewater is produced by



communities, and in Bangkok 2 million cubic metres of water is produced per day.

The freshwater source of Thailand is also faced with the encroachment of salt water, including in the lower Chao Phraya river, Tha Cheen, Bang Pakong, and Mae Klong. The quality of underground water is also a problem, with a volume of solution in underground water at a higher level than normal drinking water standards in many areas of Chiang Mai, Lamphun, Prae, Lampang and Kanchanaburi provinces. In addition, a higher level than standard of iron and fluoride was found, making the water not fit for consumption or agriculture.

The problem of water resources is a long-standing one, in terms of quantity and quality, and it has become a nationally-important issue that has affected the livelihood and quality of life of the people. It has also affected the security of economic, social and national dimensions. Although many governments have been serious and determined to solve the problem, but with the large number of agencies (48) involved with water resources management, there was an overlapping of structure, roles and responsibilities, and budget. There was a lack of a unified approach, as there was no single agency that oversaw management in the overall picture.

The turning point came when the government under the administration of Gen. Prayut Chan-o-cha, Prime Minister, resolved in a policy to reform and to seriously solve the water issues.

The government formulated goals in managing water through 4 main pillars to set the direction in improving the water management structure to achieve benefits in a concrete and timely manner, as follows :



Pillar 1

The 20-year Master Plan on Water Resource Management (B.E.2561-2580)



The Cabinet approved the Master Plan on 18 June 2019, Which includes details on the strategic goals and 6 work plans, namely

1. Management of water for consumption
2. Building water security in production for agriculture and industry
3. Management of floods
4. Management of water quality and conserving water resources
5. Restoring watershed and degraded forests and prevention of soil erosion
6. Management and administration

Pillar 2

The creation of a central agency to manage water



This is to integrate coordination among the 48 agencies related to water from 7 ministries. The agency is also tasked to set the policy, work plan and project budget at the national and river basin levels. The mechanisms involved include the National Water Resources Committee with the Prime Minister as chair, the Office of National Water Resources (ONWR) and the 22 River Basin Committees.

Pillar 3

on legal matters



The Act on Water Resources B.E.2561 came into effect on 27 January 2019. This is the main law that sets the duties and powers of water management and also indicates the drafting of secondary laws in due course. In the first phase, the secondary laws are set to be completed within 90 days of the enforcement of law, namely the Royal Decree on River Basins and Ministerial rules, regulations and announcements totaling 19 Articles and 22 documents. In the second phase, the secondary laws are to be completed within 2 years, totaling 9 articles and 4 clusters, such as the allocation and use of water, and the laws related to the request to receive water use permits (Article 104).

Pillar 4

Innovation to promote development of knowledge, expand innovation, technology, and academic outputs to move forward the Master Plan on Water Resources



The aim is to develop the water management system towards becoming modern and able to access information to use and analyse, to ease planning processes in a rapid, efficient manner and help in developing the decision-making process to be more accurate.

The 4 main pillars of work are considered a key factor in moving forward the country's water management towards more efficiency. It is also crucial in building a unified approach among related agencies in managing water, which will bring about to stronger water resources security for the country.

Chapter 2



Pillar 1 The 20-year Master Plan on Water Resource Management

The 20-year Master Plan on Water Resource Management (B.E.2561-2580) is considered important as a cornerstone in the major reform of national water resources management. It is a tool to realign the framework and structure of work, the scope and approach to move forward the management of water resources in a planned, efficient and continuous and long-term manner according to the National Strategic Plan.



In the past, although Thailand formulated the 12-year (B.E.2558-2569) Strategy on Water Resources Management, but as the former Strategy used in 2015 still contained certain targets and indicators that have not addressed the points in the 20-year National Strategic Plan (B.E.2561-2580) and the National Reform Plan in 11 areas, the government therefore ordered the reconsideration of the Master Plan on Water Resource Management to become a 20-year plan.

The objective is for the Master Plan to be used as a framework and guideline in developing the problem solving approach to water resource management issues in the country. Also, it is used to monitor the effects on the people. This is in accordance with the development approach in the National Strategy in the sector of economic and social issues, as well as in the development of river basin management in the entire system to increase water security in the country. Moreover, the goal is to have fresh water available for each and every household in the rural areas; to increase water production by finding water sources, using water conservatively and knowing its value; and to manage water disasters, mitigate damage and risk and increase efficiency of management.

In drafting the new Master Plan on Water Resource Management, the National Water Resources Committee (NWC) appointed the Sub-committee on Strategy for Water Resource Management to particularly improve the Master Plan on Water Resource Management, and set the conceptual framework for work to be guided by the Sufficiency Economy Philosophy and 20-year National Strategy (B.E.2561-2580). The 5th Strategy in the National Strategy is on environmentally-friendly growth and quality of life, as well as to hold the principle of balance in conservation, rehabilitation and development of water sources, including receiving benefit from water resources.



In addition, all 6 Strategies in the 12-year Strategy on Water Resources Management were improved upon, by adding primary and secondary plans to be able to address better the 20-year National Strategy. For example, the improved strategies include the development of standard and affordable drinking water, increased water productivity, improved efficiency of water release, the mitigation of river basin floods, the rehabilitation of canals, the prevention and decrease of soil erosion in forests in water sources, and the drafting of plans to use river basins. This Strategy with addendum was presented to Cabinet and approved on 18 June 2019. The main points of the 20-year Master Plan on Water Resource Management (B.E.2561-2580) consists of 6 areas, as follows :

Master Plan Area **1** **Management of water for consumption**

Objective

For clean water supply and consumption for the community, to include all villages, households, urban communities, important tourist destinations, and special economic zones, as well as the identification of alternative water sources in areas that lack water sources as capital, development of drinking water to be standard and at affordable cost, and conservation by decreasing usage in households, service industry and government sector.



The goals



The goals set are for the development, expansion and increase in efficiency of the village water system of 20,034 villages, to develop urban water systems/economic zones in 404 cities, identifying 43 million cubic metres of alternative water sources, develop drinking water to be standard and at affordable cost for all villages by 2030, and conservation by decreasing usage in households, service industry and government sector at not over 215 litres/person/day. This is to be implemented under a set plan.

Mobilising



On mobilising agencies, the Ministry of Interior will be the main agency for coordination and moving the task forward. The Department of Local Government and Department of Water Resources are the main implementing agencies in setting the standard and its format, as well as in supporting local agencies in surveying, designing and implementing pilot projects and transferring the know-how and technology for capacity building so that locals can carry on the projects themselves in due course.

Master Plan Area **2** **The achievement of water security in the production sector**

Objective

To develop new water reservoirs and water delivery system to the fullest potential, finding water sources in agricultural rain areas to expand the opportunities of smaller projects and lessen the risks in areas with no potential, to decrease damage to 50%, as well as increase productivity and improving the water usage structure, in alignment with the National Strategy in creating better competitiveness and providing opportunity and equality in society to elevate the systematic productivity of water.



The goals



The target for conserving water in the agricultural and industrial sectors is 152 million cubic metres, while the target volumes for greater efficiency in old water delivery system and source project is 717 million cubic metres, for agricultural rain areas is 12,375 million cubic metres with 18 million rai of land benefitting, for development of reservoirs and water delivery system is 13,439 million cubic metres with 18 million rai benefitting, and for water diversion and water source connection is 2,596 million cubic metres. The target volumes also includes the increase of production value through the promotion of agriculture, plants and crop growing in 6,210 rai and the increase of water source as capital through the Royal Rainmaking project. The integration plan for use of rain in agricultural land has set the target of solving the drought problem in 50% of the villages. Moreover, management in special areas require integrated planning for floods and droughts. Sixty-six areas are included.

Mobilising

In mobilizing this plan, the Office of National Water Resources (ONWR) is assigned as the main agency in coordinating and mobilising with operational agencies in developing small water sources in drought-risk areas. The Office is also tasked with management in special areas which requires integrated planning for floods and droughts, the use of technology to conserve water in the industrial sector, the increase of productivity and structural adjustment in water usage in agriculture and industry, and the sourcing of water to support the Eastern Economic Corridor (EEC).



Master Plan Area **3** **Management of floods**

Objective

To increase the efficiency of water drainage, flood-prevention system in urban communities, management of flooded areas and flood holding area, including for area-based systematic flood mitigation in river basins, large river basins and tributary river basins to decrease risks and severity.



The goals

The objective is to improve 5,500 kilometres of natural rivers, remove 562 obstacles on water routes, protect against flooding in 764 cities, totaling 1.7 million rai of protected land together with a plan for every major river basin, and to be able to manage flooded areas and flood holding areas, preventing around 3.68 billion cubic metres of flood water in 5 million rai of land. Also, a systematic mitigation of floods is envisioned in river basins and crises areas of at least 60%, as well as an adaptation and emergency situation support scheme of at least 75% of the area affected.



Mobilising

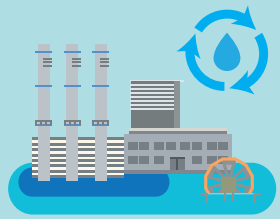


On the approach in moving forward, a plan to mitigate floods in crises areas will be drawn up to decrease the damages by 50% in crucial areas. The Ministry of Interior and Department of Public Works and Town and Country Planning are the main agencies assigned to manage floods and drainage of rainwater, especially in Bangkok and major cities, as well as the improvement of water drainage efficiency.

Master Plan Area **4** **Management of water quality and water resources conservation**

Objective

To develop and increase efficiency of the collective wastewater treatment system, by reusing treated waste water, protecting and decreasing waste water from the source, regulating the volume of water flow to preserve the ecology, and rehabilitating rivers, canals and natural rivers that are important in every dimension, for the conservation, rehabilitation and usage across the country.



The goals

The objective is to prevent and decrease the creation of wastewater in new urban communities, developing and increasing the efficiency of wastewater treatment system of 741 locations, and maintaining the balance of the ecology through drafting a water allocation plan, in the 13 main river basins and the preservation and rehabilitation of 1,000 rai of rivers, canals and natural rivers across the country.

Mobilising

As for the approach to move forward, there will be a plan to increase the efficiency and control of wastewater drainage to the environment, the conservation and rehabilitation of water sources such as creeks and wetlands that should be protected as a public water source, and the preservation of rivers, canals and large water sources.

Master Plan Area **5** **Preservation of watershed and degraded forests and protection against soil erosion**

Objective

For the preservation and rehabilitation of watershed and forests that are depleting, and for the protection and prevention of soil erosion in water source and steep land areas.



The goals

The objective is to preserve and rehabilitate forests watershed areas of 3.5 million rai and prevent soil erosion in 23.45 million rai of land in water sources.

Mobilising

To move forward this Master Plan area in rehabilitating forests watershed, the Ministry of Natural Resources and Environment was assigned to be the main agency in mobilising the work, from identifying the scope of use as Conservation Zone or Buffer Forest Zone and making use of suitable land in river basins level 1 and 2 that have been exempted according to Cabinet resolution. The implementation will be in target areas that are severely affected in terms of resources, namely the river basins of the northern and southern regions in the initial stage. There will also be consideration in terms of tactical and structural improvement by planting crops in parallel to prevent the erosion of inner soil layers.

Objective

The creation of an organisation to manage water resources, such as the National Water Committee and River Basin Committee, while improving and modernising laws, for developing database and the national water bank, as well as to support river basin organisations, information exchange between public and private sectors, management of irrigation, research development, innovation, and technology for the promotion of value-added in services and production, and the development of new formats to elevate the management of water in land areas and river basins including in the dimensions of marketing, energy, production and waste.

The goals

The targets were set to draft, improve, review the laws and regulations on water resources, promote organisational development, and manage water resources in the national and river basin levels to become a mechanism to develop international cooperation on water resource management. Moreover, a master plan at the river basin level and plan to manage water at river basins in crises times were drafted. Monitoring and evaluation of work plans under the Master Plan, as well as follow-up with implementing agencies, is possible.



As for the implementation of the 20-year Master Plan on Water Resources Management in its 6 areas, a short-term plan of the first 5 years (2018-2022) was set to concretely solve important problems for the people. This includes the development of systematic river basin water management to strengthen the country's water security, so that all households in remote rural areas will have clean water. Moreover, the productivity of water in the entire system will be improved by identifying water sources and using water conservatively, and there shall be the creation of a water disaster management system to minimise damage and decrease risks from water disasters using academic principles as reference.

There is also a need to find water sources and use water in a balanced manner, and the effort must be one that is modern, timely and just. The measures in structure, regulations, management of organisation, data management, warning release, and research and innovation development should be able to mobilise the work under the Master Plan on water and Act on Water Resources in a sustainable manner.

Chapter 3



Pillar 2
Water Resources Management Organisation

Water resources management organisations are at the heart of the system reform of national water management, and through these agencies, the practical results can be seen in a timely and rapid manner. In the past, the management of Thailand's national water resources was scattered among the duties and powers of more than 48 agencies, creating a lack of unity and connectivity in management, causing duplication, waste of budget and a disintegrated effort in solving the national water problems.

The Office of National Water Resources (ONWR) was created by the National Council for Peace and Order (NCPO) command No.46/2560 on 25 October 2017 founding the Office of the Management of National Water Resources with duties as the central agency in integrating management of water resources of the entire country, to be the integrated agency for information communications, project planning, budget plan, and follow-up and evaluation of the water resources management for the formulation of management policy on water resources. Subsequently, NCPO command No.2/2561 on the assignment of tasks and allocation of personnel of the Office of National Water Resources dated 22 January 2018 changed the name of the Office of the Management of National Water Resources to the Office of National Water Resources.



"The ONWR is therefore like the Supreme Command unit on water issues, with its duty in studying and analyzing the water situation to formulate policy, provide water resource management proposals and integrated budget proposals to present to the National Water Resource Committee (NWRC) for approval. The duty also includes follow-up and evaluation of water resource management according to the policy, strategic plan, master plan and the integration of information communication both domestic and international, to assess the needs of water use and sufficiently address such needs."





Roles and duties of the ONWR

Policy advisor

Propose policy on water resource management, master plan on water and various master plans

Regulator

Regulate, manage and issue regulations and meausures as we a follow-up and evaluate

Facililator

Manage and mobilise important projects

Operator

Operate in crisis situations, manage information for meetings, conduct training on water resource management, especially in risk situations



The ONWR has reached its second year as a regulator agency in managing the water resources in the entire system. It acts as the secretariat of the National Water Resource Committee, with the Regional ONWR offices acting as the secretariat of the River Basin Committee, as set in the Act on Water Resources B.E.2561. Both the national and river basin level committees have the same members at this period of transition, utilizing temporary article 100 and article 101 of the Act on Water Resources B.E.2561. The articles dictate that in the period that the Royal Decree on designation of river basins (article 25) has not been promulgated, the same members of the Committee shall perform the duty ad interim. This is according to Office of the Prime Minister's Regulation on Management of National Water Resources B.E.2550, and its addendum, for committee members who were in position before the Royal Decree on designation of river basins (article 25) came into force.

Also, in the period that the new committee members have not been appointed, according to article 9 (4) and that the eminent persons have not been appointed according to article 9 (5), the current committee members shall continue to perform the duties ad interim until a new appointment of members and eminent persons, as per Office of the Prime Minister Order 24/2561 on the appointment of the National Water Resource Committee dated 29 January 2018. The ONWR is currently in the process of drafting a secondary law in related areas to be able to appoint the River Basin Committee and NWRC according to the law, to achieve the law's objectives in guaranteeing the basic rights of the people in accessing public water resources. In addition, there would be an organisation created to manage water resources at the national, river basin and consumer organisation levels.



1 Water Resources Management Organisation at the national level

According to article 9 of the Act on Water, the National Water Resource Committee (NWRC) is to consist of (1) Prime Minister as Chair of the Committee (2) Deputy Prime Minister assigned by the Prime Minister as Vice Chair of the Committee (3) Committee member ex-officio, namely, Minister of Agriculture and Cooperatives, Minister of Transportation, Minister of Natural Resources and Environment, Minster of Interior, Minister of Industry, Secretary-General of the National Economic and Social Development Board, Secretary-General of the Office of the Royal Development Projects Board and Director of the Bureau of the Budget (4) River Basin Committee members (6 persons) (5) Eminent persons (4 persons).

The National Water Resources Committee has the following roles, duties and powers according to the law :

1. formulate policy and Master Plan on water resource management in accordance with the National Strategy to propose to the Cabinet



2. consider approving the plans of action of government agencies and local administrative organisations related to water resources and water resources budget plans, in an integrative manner and in accordance with the policy and Master Plan in (1), and propose to the Cabinet for approval of annual budget

3. consider approving the Master Plan on usage, development, management, maintenance, rehabilitation and conservation of water resources in various river basin areas, as proposed by the River Basin Committee in article 35(1)

4. regulate, control, expedite, verify, follow-up and advise government agencies and local administrative organisations to work in the direction of the policy and Master Plan in (1), as well as the plans of action and budget in (2), and report to the Cabinet for information every end of fiscal year

5. consider approving the water landscape plan as proposed by the Office and announce the plan in the Royal Gazette



6. propose or direct the approach to government agencies or local administrative organisations in enforcing laws related to water resources management for water quality and management of water pollution, within the scope of the duties and powers of the government agencies or local administrative organisations in the area

7. propose to Cabinet to consider solving problems related to the operations of government agencies or local administrative organisations in areas that have worked under the law, rules and regulations on the usage, development, management, maintenance, rehabilitation and conservation of water resources for better integration and the people's participation

8 identify the government agencies or local administrative organisations that must cooperate with the Office in gathering and connecting information, and integrating on water resources



9 set the framework of regulations, operating approach of the River Basin Committee, and prioritise the usage of water in different activities, so that the River Basin Committee can consider water allocation and regulation in each river basin



10 consider approving the plan to prevent and solve drought situation and the plan to prevent and solve floods of each River Basin Committee, so that there will be an integration of flood prevention to address the flood situation across the river basins

11 consider approving the permission of the usage of the third type of water according to article 44 and revoke the permit of the usage of the third type of water according to article 45

12 consider approving water diversion across river basins and diversion from international or foreign water sources

13 mediate and adjudge conflicts between River Basin Committee members



14 advise on the promulgation and amendment of Royal Decrees or Ministerial regulations in accordance with the Act



15 propose to the Cabinet, government agencies and local administrative organisations to add an article in the law or amend the laws, regulations, guidelines or local commands related to water resources management

16 issue regulations on measures to promote and support the private sector, public and community to participate in the development, management, maintenance, rehabilitation, conservation and other tasks related to water resources

17 other operations as included in this Royal Decree or as set by other related laws as being the duties and powers of the NWRC, or as assigned by the Cabinet



Under article 20, the law outlines the appointment of a sub-committee under the National Water Resources Committee, and that it must at least consist of sub-committees on development and water resources conservation, water resources management, and technical issues. If necessary, the NWRC has the power to appoint a provincial-level sub-committee on water resources, to integrate water resources management at that level.

2 Water Resources Management Organisation at the river basin level



According to article 27, the River Basin Committee is to consist of representatives from related government representatives in the area and representatives of the people in the respective river basin, namely

1 River Basin Committee ex-officio members

The law stipulates that the Governors of Provinces in river basin areas in every province shall be committee members and select among themselves the chairperson of the committee. There shall also be on the committee representatives of government agencies that have an important role in water resources management, namely representatives from Pollution Control Department, Marine Department, Royal Irrigation Department, Water Resources Department, Department of Groundwater Resources, Land Department, Fisheries Department, Department of Disaster Prevention and Mitigation, Forestry Department, Land Development Department, Department of Public Works and Town and Country Planning, Department of Local Government, and the Department of National Parks, Wildlife and Plant Conservation. If any river basin is near land border areas, the law stipulates that a representative of the Ministry of Defense shall be on the River Basin Committee, while if any river basin is near a sea border, the law stipulates for a representative of the Department of Marine and Coastal Resources to be on the Committee. In addition, if river basins are in Narathiwat, Pattani and Yala provinces, the Southern Border Provinces Administrative Centre shall be a member of the Committee.

2 River Basin Committee members who are representatives of local administrative organisations :



One representative per province from the local administrative organisations shall be a Committee member, and if the river basin is a special status local administrative organisation, its executive shall be a Committee member. This means that in the Eastern coast, the Mayor of Pattaya shall be a member and in the Chao Phraya River Basin, the Governor of Bangkok shall be a member of the Committee.

3 River Basin Committee members who are representatives of water consumer organisations

There shall be 3 members each from the agriculture, industry and commercial sectors.



4 River Basin Committee members who are eminent persons



There shall be 4 members from this group on the Committee. The composition of the Committee as outlined is a reflection of the participation of the people, from the users group who are able to assemble and register as an organisation and send representatives from the agriculture, industry and commercial sectors to join the River Basin Committee to manage water in the river basin. These committee members may be selected to become river basin representatives in the National Water Resources Committee as indicated in the related laws.

The River Basin Committee has the role and legal powers, in

1. Drafting a Master Plan on the use, development, management, maintenance, rehabilitation and conservation of water resources in the river basin areas

2. Drafting a plan to prevent and solve the drought situation and plan to prevent and solve the flood situation.



3. Considering the volume of water used, the allocation of water and prioritising the use of water in river basins and regulating the use of water.



4. Setting the criteria and regulations in developing, managing, maintaining, rehabilitating and conserving water resources.



5. Approving the permission to use water for the second type of use, as well as the revoking of such permission.





6. Considering and proposing suggestions to the NWRC on water diversion across river basins.

7. Proposing suggestions to the NWRC on plans and projects related to water resource management



8. Receiving complaints, mediate and adjudge conflict between water users.



9. Coordinating with government agencies and local administrative organisations on the enforcement of laws related to water resources on its usage, development, management, maintenance, rehabilitation and conservation, as well as laws related to water pollution in river basins.

10. Promoting and campaigning for the building of conscience of the people in the use, development, management, maintenance, rehabilitation and conservation of water resources.



3 Direction of moving forward the water resources management from the policy to the river basin level, according to the Act on Water Resources B.E.2561 and 20-year Master Plan on Water Resources Management



From the duties and powers granted by the Act on Water Resources B.E.2561, it is considered a new dimension in the work of the organisation responsible for water resources management and one that plays a key role in drafting the national and local area level plans.

The national-level plan is

• the 20-year Master Plan on Water Resource Management.

The river basin level plan is

• the Master Plan on River Basin Management, that has to connect with the national plan and identify the problems and needs from the river basins and align it with the objectives set in the Master Plan in each area. This is to ensure that the Master Plan is most efficient and receives budget in solving problems to address the real needs of the people in the river basin area,

• the flood and drought prevention plans as mechanisms in integrating the preparedness in water-related situations.



The River Basin Committee in this new era will have the duties and powers to prioritise the use and allocation of water by approving the permission of second-type water usage. The permission of water usage is an important process in the mechanism of managing water resources and building conscientiousness in conserving water in different sectors. The Act on Water Resources also stipulates that the River Basin Committee is responsible for mediating conflict between water users, coordinating with related agencies in law enforcement and in building the conscience of the people in river basin areas. The water law is an historical law in reforming national water resources and it emphasizes the participation of the people in managing water resources in river basin areas. The River Basin Committee is the coordinating unit in administering work and integrating with all sectors, so that water management in river basins will be most efficient and effective.

Chapter 4



Pillar 3 The Act on National Water Resources B.E. 2561

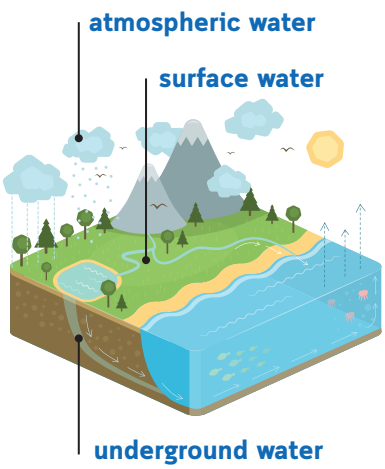
“Water law” used for the first time in Thailand’s history

In Thailand, we still repeatedly face problems related to water, such as flooding, drought, and wastewater. These problems are, for all governments, a challenging problem. With the hard work of agencies involved, the problem may be addressed, but the problem will not yet be solved comprehensively and efficiently enough. This is because in solving the problem, the process passes through many agencies which have different duties and powers from different laws, thus causing duplication, lack of unified approach and involvement from many sectors, especially from the general public which is still lacking.

Since the olden days, Thailand had a law about water management for ditches, canals and rivers used mainly for travelling and cleaning convenience. A Royal Command was granted in the reign of King Rama V to dig canals in Bangkok and its vicinity. In 1900, the Department of Canal was founded (which later became the Royal Irrigation Department) and there was a Canal Treatment Act of B.E. 2445 aimed at management and maintenance canals. There was also an Act of Public Irrigation of B.E. 2482 and Act of Royal Irrigation B.E. 2485 for irrigation management, which mainly gave the power of water management in irrigation routes and areas mainly to the Royal Irrigation Department.



When the country's growth expanded, a law was formulated to grant the government agencies more power to manage water, such as Groundwater Act B.E. 2520 which gave the Department of Groundwater Resources authority to manage groundwater. In addition, there were more than 36 Acts, 2 Royal Decrees, and more than 2,418 ordinances giving power to 42 agencies in water management in line with their own duties and missions.



However, the work on water management is still facing problems. There are 3 types of water systems which are atmospheric water, surface water, and underground water. The Royal Irrigation Department has the duty and power to manage water and has the authority to grant permission for the use of water for irrigation. The Department of Groundwater Resources has the duty and power to manage underground water, including the authority to grant permission for digging and use of groundwater. For general surface water outside of irrigation areas, it is however not covered by any law that gives responsibility and power to any agency to permit the use of general surface water outside the irrigation area. This is the reason why the water system cannot yet be managed as a integrated system.



For the physical condition of water, it will flow from higher areas to lower areas. Some of the water seeps in the ground and becomes underground water. When the ground is soaked in the lowland, it creates wetlands, pools, ponds, canals, stream, creek, river, and ends up in the sea. In each year, when flooding or droughts occur, water resource management is difficult and involves people's lifestyle in every context. Therefore, to have water management laws only in parts of the system in Thailand does not enable the solving of past and future problems as the country develops. It is important to have a master law for the entire water management system which includes general surface water outside irrigation areas, surface water in irrigation areas, underground water, and also including the sea water which is the boundary between countries. It is important to have central laws to manage water resource, and connect them with older laws to comprehensively manage the entire water resource system.

In 2017, the Government administration of Gen. Prayut Chan-o-cha, Prime Minister, proposed the Act on National Water Resources B.E. ... to the National Legislative Assembly. The National Legislative Assembly considered to announce this as a law on 4 October 2018, and subsequently the Act was announced in the Royal Gazette on 28 December 2018, and became effective on 27 January 2019. The Act on National Water Resources B.E. 2561 was intended to be a law for integration of management, development, organization, maintenance, recovery, water resource conservation and the right to use the water. The Act is intended to bring about the management of national water resource underscoring unity, balance, and sustainability.

The Act on National Water Resources B.E. 2561, the first law on water resources in Thailand, consists of the following main points ;

Main points The Act on National Water Resources

1 There are 8 scopes of enforcement

which are allocation, usage, development, organisation, maintenance, recovery, conservation of water resources, and water rights.



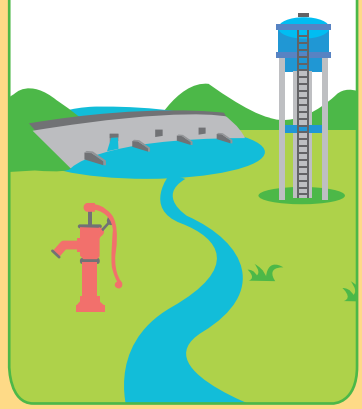
2 Formulate the rules for basic rights of people to access public water resources

and rights about water retention in necessary volumes without causing damage.



3 Systematising water resource management

covering management of water resources in irrigation areas, outside irrigation areas, and underground water.



4 Apply integrated water resources management

by making a policy and master plan linked with national strategy by improving mechanisms appropriately, such as

- Management of water resources
- Formulating a master plan about usage, development, organization, maintenance, recovery, and conservation of water resources in the basins for management of forests, land, and the ecosystem for the benefits of water management performance, environment management, land usage, and space management.



- Formulating an action plan about water resource by government or local government organisation.
- Formulating a budget plan about integrated water resources management in line with policies and master plan so that it will not cause overlapping budget usage by government or local government organisation.

5

Create a water management organisation

in the national level, river basin level, and enterprise level by making people have responsibility in water resource management.



6

Setting the rules of water allocation justly and appropriately

by dividing water use into 3 types

1



2



3



- The first type of water usage is using public water resource for living, household consumption, farming or raising animals for sustenance, household industry, preserving the ecosystem, tradition, disaster relief, communications, and using a small volume of water.
- The second type of water usage is using public water resource for industry, tourism industry, electric power generation, water supply, and other parties.
- The third type of water usage is using public water resource for large scale businesses that use a large volume of water or may cause impact across the river basin or large area.

7

Defining the authorisation system of public water resource usage

in case of water usage that is over the limit for basic water use rights.



8

Establish preventive measures and solving the drought and flooding conditions



- Formulating a protection plan and solving drought conditions by integration with National Disaster Prevention and Mitigation Plan.
- Formulating a protection plan and solving flooding conditions by integration with National Disaster Prevention and Mitigation Plan.
- When there is a water crisis, there needs to be special command center for protection, solving, controlling, suspending, or immediately mitigating negative effects.

9

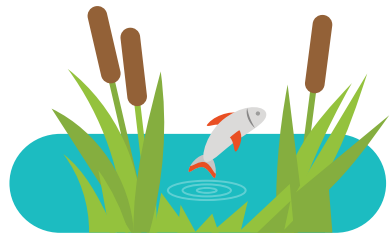
Setting measures to promote and support the private sector, people and community to participate in water management.



10

Setting the conservation and development of public water resources

- For areas that have characteristics of water source, creek or wetlands, the area will be declared an environment-protected area.
- Setting the criteria for making use of land that may affect public water resources, so that there will be no danger or damage to public water resources.



11

Setting civil offense for damage to public water resources and for government agencies or local administration to represent the government

in filing cases to receive compensation for damage.



12

Setting of penalties

including jail term, fine, or both.



The Act on National Water Resources B.E.2561 is considered an important progress in the national management of water resources in the integrative approach. This corresponds to the fast-changing context of society and will avoid duplication in budget and water action plans, as well as help facilitate the coordination of information between government agencies in normal and crises circumstances. It will create a data base on water that is clear and able to be used in systematically and most effectively deal with droughts and floods.

Chapter 5



Pillar 4
Knowledge, Innovation and Technology
for Water Resources Management

The implementation of national water resources management is to be achieved in all 3 main pillars, namely, Pillar 1 or the 20-year Master Plan on Water Resources Management, Pillar 2 or the creation of the water management organisation, the National Water Resources Committee, Office of National Water Resources, and River Basin Committee, and Pillar 3 on legal matters, and the creation of the Act on Water Resources B.E. 2561.

Chapter 6



Next steps toward Thailand's water resources management

The Office of National Water Resources is determined to build stability in all 4 pillars and expand the role and participation of the people in managing water resources through the mechanism of the River Basin Committee and various types of users organisations, as follows.

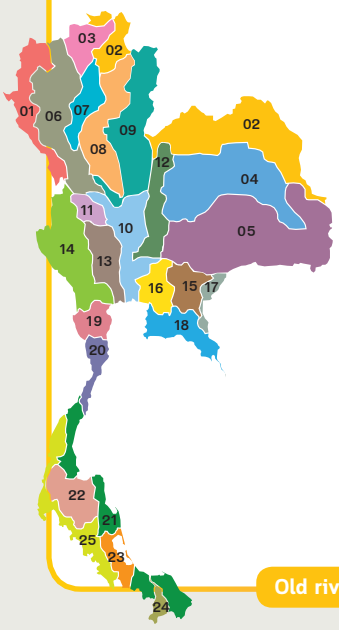
1 Moving forward secondary laws under the Act on Water Resources Management B.E.2561

Secondary laws are to be drafted, namely Royal Decree, Ministerial Regulation, Regulation and Announcement following the Act on Water Resources B.E.2561, especially in key articles, such as :

Article 25 identifies river basins, to be promulgated as a Royal Decree, while being mindful of the situation in the context of hydrology, geographic conditions, ecological system, habitation, urban planning, water landscape and administrative zones. With this as reason, in 2018 the Office of National Water Resources, together with Kasetsart University, implemented a study review project on the categorisation of river basins to improve its suitability for water resources management and in light of the effects from high-tide river basin categorization. The objective is to achieve more efficient categorisation of river basins. Detailed data was used from the high-resolution maps of the scale 1: 4,000 WGS84 from the Department of Land Development and 3-dimension aerial image maps from Google Earth to be able to analyse the water flow in a more accurate manner. The review of area division of river basins has resulted in having 22 main river basins, in place of the 25 main river basins.

New area division of river basins

25 main river basins
254 tributary river basins



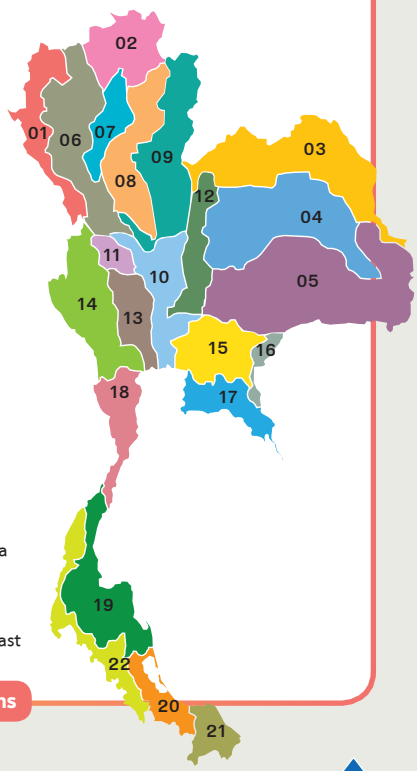
01 Salawin
02 Mekong
03 Kok
04 Chi
05 Mun
06 Ping
07 Wang
08 Yom
09 Nan
10 Chao Phraya
11 Sakae Krang
12 Pa Sak
13 Tha Chin
14 Mae Klong
15 Prachin Buri
16 Bang Pakong
17 Tonle Sap
18 East Coast Gulf
19 Phetchaburi
20 Prachuab Khiri Khan Gulf
21 Peninsula-East Coast
22 Tapi
23 Thale Sap Songkhla
24 Pattani
25 Peninsula-West Coast

Old river basins

01 Salawin
02 Northern Mekong
03 Northeastern Khong
04 Chi
05 Mun
06 Ping
07 Wang
08 Yom
09 Nan
10 Chao Phraya
11 Sakae Krang
12 Pa Sak
13 Tha Chin
14 Mae Klong
15 Bang Pakong
16 Tonle Sap
17 East Coast Gulf
18 Phetchaburi - Prachuab Khiri Khan
19 Upper Part of Peninsula-East Coast
20 Thale Sap Songkhla
21 Lower Part of Peninsula-East Coast
22 Peninsula-West Coast

New river basins

22 main river basins
353 tributary river basins



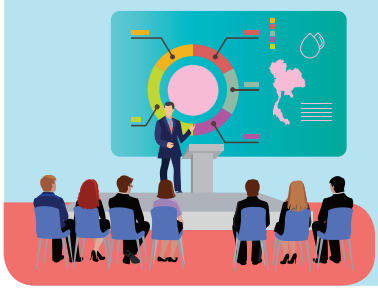
Article 27 : When the Royal Decree identifying the river basins according to Article 25 has been completed and a River Basin Committee of each river basin has been appointed, Article 35 would set the duties and powers of the Committee in management of water resources. Such duties include the drafting of a Master Plan on the use, development, management, maintenance, rehabilitation and conservation of water resources in river basins, as well as drafting of a plan for prevention and solving of flood and drought situations for the National Water Resources Committee to approve, with the Office of National Water Resources as the secretariat of the Committee.

Apart from this, in managing water resources towards reaching the set objectives, and build unity and effectiveness, Article 20 gives the National Water Resources Committee (NWRC) the power to appoint committee members to consider, propose or implement a particular task to bring in development, water resource conservation and management, and technical support. If necessary, the provincial level Sub-committee may be appointed for the benefit of integration of provincial-level water resource management. This is management in the Area-based approach and according to governance, aside from the river-basin based approach.

2 Utilising and feeding the 20-year Master Plan on Water Resources Management (B.E.2561-2580) into the River Basin level plan and mobilise its implementation

The Cabinet has approved the 20-year Master Plan on Water Resources Management (B.E.2561-2580) on 18 June 2019, which is in accordance with the 20-year National Strategy, Master Plan under the National Strategy and Sustainable Development Goals (SDGs). The agencies involved with water total 52 agencies.

The next challenge is to bring the 20-year Master Plan on Water Resources Management to feed into the Master Plan on water resources management at the river basin level and the plan of action at the river basin level under the Master Plan. This is to set the indicators and objectives in the river basin level, and leading to the planning of projects that are in line with the problem situation and needs of the people in the river basin.



As for the target areas that need Area-Based planning to solve problems, which are in 66 locations, ONWR has studied and proposed solutions to the National Water Resources Committee for approval and for inclusion in the 20-year Master Plan on Water Resources Management. Related agencies are instructed to plan projects to be suitable for such area-based details.

3 Upgrading the central agency on water



With additional duties as directed by the Act on Water Resources B.E.2561 and the related Cabinet resolution, ONWR has embarked on new structural changes to be able to address the new duties. For example, the new Division on International Affairs and Regional Water Resources Office scattered across the regions were created. The Office is also ready to serve as Secretariat of the River Basin Committee to work in sync with the National Water Resources Committee.

Another important task is the development of an ad-hoc crises centre, as the special command centre for emergency cases of water crisis that may affect the lives of the people, animals or plants, or severely damage to the property of the people of government. The Prime Minister shall be the commander of this centre which will direct the solving of crises problems on a temporary basis until the water crisis situation passes.



4 Promoting Pillar 4 on Innovation and Water Resources Technology towards security

ONWR cooperates on water at the policy level with international partners, while supporting the exchange of knowledge, expertise, and experience from foreign countries to be adapted for use in Thailand's management of water resources. In addition, a directory of local knowledge and wisdom was created to be disseminated to related agencies, or to be used in a pilot programme in other localities, as appropriate.

The water resource management of Thailand must have the cooperation from all related sectors in the operations, be it the civil society sector, private sector, and all government agencies. The effort is to mobilise the 4 main pillars of water management to be able to acheive the targets set for balanced, just and sustainable water management that is in line with the climate change situation and in accordance with the Act on Water Resources B.E.2561.

To achieve sustainable water management, the Government has therefore identified Pillar 4 on Innovation to increase the efficiency of water resources management to become more modern and sustainable with the support of research, data, inventions, innovation and various technical cooperation to elevate the development of national water resources to be more modern. This is in line with the climate change situation and community's way of life, and makes the water resource management projects more flexible and environmentally-friendly, according to international standards. A role in moving forward work under Pillar, the focus is on 3 areas, namely,

Development of innovation, technology, and research

to add on to the management of water resources in the most efficient way.



Building networks of cooperation in the national and international levels

to exchange technical knowledge and have technology transfer that is suitable for each region's social landscape.



Promoting a process of participation of related agencies in managing water resources

including private sector and civil society, in accordance with the Act on Water Resources B.E.2561.





There have been many notable outputs in many dimensions, namely cooperation with the Geo-Informatics and Space Technology Development Agency (GISTDA) in using satellite imagery technology to survey data on "water source data account" and develop an application to keep water source data to use when handling flood and drought situations. There are 3 categorisations of reservoirs according to water volume capacity, namely, large-sized reservoirs of 100 million cubic metres and up, medium-sized reservoirs of 2-100 million cubic metres and small-sized reservoirs of less than 2 million cubic metres of water capacity.

Aside from this, there is the adding-on of the use of innovation in managing water in the "Nearly Real Time Analytics format" to help in accessing information and to facilitate its use in a convenient, rapid and timely manner. This will lead to more accurate decision-making in water management through the "One Map" technology that would create a "national data bank on water and climate" as a database gathering real time information from related agencies. Such include information from the same channel, on rain, rain and storm forecast, flood water, level of water in different sources, such as reservoirs, large natural water sources, and main rivers; as well as water quality and emergency areas.



The ONWR also connected information and technology from different agencies to be integrated and prepared for the rainy season. This was done through analyses of flood-risk areas, to set the criteria for cooperation, warning systems, and work plan for the Flood Operations Centre during the rainy season in the 3 alert levels. The ONWR also coordinated with agencies to report information to the ONWR every 3 hours during emergencies. As for critical situation areas, the reporting must be done every hour. The information received will be sent to the central Public Disaster Prevention and Mitigation Centre, under the Department of Disaster Prevention and Mitigation, to be utilised to provide assistance to the people.

The Office of National Water Resources also focused on promoting research output and academic pieces to be applied to increase the efficiency of water management. On 21 March 2018, the ONWR signed a memorandum of agreement with the Thailand Research Fund to set a timeframe of 3 years in developing and supporting proactive investment in resources, and in expediting the creation of a nationwide university network to move forward research on water resources management. In the first phase, the focus will be on research in the Eastern Economic Corridor (EEC) and to be followed in due course by research to address the 20-year Master Plan on Water Resources Management.

Aside from this, on 25 October 2018, a memorandum of agreement on technical cooperation was made between 12 top educational institutions to build on technical cooperation between all the agencies involved. The objective is to disseminate knowledge among the 12 educational institutions, understanding and policy related to management of water resources to the utmost benefit, in the areas of engineering, information technology, environment, economics, society, and climate change. The institutions are Chulalongkorn University, Kasetsart University, Khon Kaen University, Chiang Mai University, King Mongkut Institute of Technology Thonburi, Thammasat University, Naresuan University, Mahidol University, Burapha University, Walailak University, Songkhla Nagarindra University, and Ubon Ratcha Thani University.



The ONWR also studied and evaluated the strategic-level environment of the river basin area, with analyses of the potential and limitations of the environmental capacity, to set the direction of sustainable development and build a balance between economy, society and environment. This will lead to the planning of the master plan for management of water resources in each river basin, which will be in accordance with the most suitable direction of development and the real needs of the local area, with the participation of all sectors of society. In fiscal year 2019, 5 pilot river basins were studied, namely the river basins



of Sakrae Krang, Prachinburi-Bangpakong, Chee, Mun, and Eastern area. Two more river basins will be studied in 2020, namely Phetchburi-Prachuab Kirikhan and Western area river basins.

At the same time, the ONWR also utilised technical and academic work to improve water resources management in reservoirs, using 3 graph curves to control risk. This is in addition to the management of water resources in dams using 2 graph curves, which are the Upper Rule Curve, with the top curve to control the high level water and the Lower Rule Curve with the lowest curve for the lowest water level. However, due to the weather conditions and changing rain situation, using only 2 graph curves is not enough. The 3rd graph curve was created, which was the more dynamic curve to manage water levels in a more flexible mode, in line with the situation in each year.

This has helped improve water management as it considers the climate conditions and each year's rainfall as well. Currently, the ONWR has asked the cooperation of the responsible agencies in taking care of reservoirs, and in improving the tools for reservoir management that is more modernised and in accordance with real conditions. Data used spans back 20 years and current data is also put into consideration. This has helped improve graph indications of the 35 large-sized reservoirs to be of good standing.



Not only is there cooperation on innovation and technical output with agencies in the country, but the Office of National Water Resources has also cooperated with water-related agencies abroad to bring in academic work, innovation and technology to develop the water management system of Thailand. Such countries include Australia, United States of America, France and the European Union.

For example, there is cooperation between the Office of National Water Resources and the German international cooperation agency GIZ to build adaptation measures using Ecosystem-based Adaptation (EbA) at the policy level and in different regions. Moreover, the opportunity to use EbA is created to plan the preparedness for climate change. In 2019, a pilot activity was already carried out in Yom River Basin and Sakrae Krang River Basin before expansion to other areas.

The promotion of international cooperation on water was done through the Memorandum of Understanding (MOU). The MOUs that have been signed are the MOU on Water Resource Management Cooperation between the Office of National Water Resources of the Kingdom of Thailand and the Ministry of Environment of the Republic of Korea on 2 September 2019 and the MOU on Water Resource Management Cooperation between the Office of National Water Resource Management of the Kingdom of Thailand and the Ministry of Interior of Hungary. There are also plans to cooperate with foreign countries on water in the future. Such plans include cooperation with China in the research project on Joint Assessment of Thailand and Myanmar on Flood and Drought for Transboundary Water Resources Management under the special fund of the Mekong-Lancang cooperation framework, the drafting of an MOU on integrated water resource management cooperation and adaptation for climate change with the Kingdom of the Netherlands, the drafting of an MOU on integrated water resource management cooperation with United States Army Corps of Engineers, United States of America, as well as the entry into membership in the Asia Water Council, which will expand the network of the Office of National Water Resources with water-related agencies in the Asian and global stage.

In addition, technical experts from foreign countries were also invited to transfer knowledge on the water layout formulation plan. From South Korea, knowledge was transferred on water layout plans that are clearly marked, such as in international rivers. For Germany, a water layout plan was designed to complement shipping routes, geographical landscapes and the environment. From the Netherlands, knowledge was transferred on management of areas below sea level.

As we can see, the implementation of the 4th Pillar on Innovation has brought Thailand at the forefront of innovation, technology and academic results. This has been adapted to concretely manage the country's water resources, and is in line with the 20-year Master Plan on Water Resources Management in the 6th area on Management. It also helps create transfer of technology that is suitable for the social conditions of each region and a participation process for related agencies, including the private sector and civil society. Thailand's water resources management is thus more efficient, modern, and in line with the current situation.

