Mainstreaming Water Security Strategy into National Water Strategy

Asst. Prof. Piyatida Ruangrassamee and Assoc. Prof. Sucharit Koontanakulvong
Department of Water Resources Engineering,
Chulalongkorn University, Bangkok, Thailand
Piyatida.H@chula.ac.th

Research Expo
2 October 2020

Contents

1. Definitions of Water Security
2. Key Aspects of Water Security
3. SDG 6 Sustainable Water and Sanitation for All
4. Asian Water Development Outlook
5. Thailand’s National Water Strategy and Master Plans
6. Research Roles and Key Research Results

Water Security Definitions

Water security is defined as the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.

Accessibility

Adequate quantities

Livelihoods & well-being

Quality & safety

Socio-economic development

Ecosystems

Protection against Pollution & Water-related disasters

Key Aspects of Water Security

1) Access to safe and sufficient drinking water at an affordable cost in order to meet basic needs, which includes sanitation and hygiene (cf. United Nations General Assembly, 2010), and the safeguarding of health and well-being;
2) Protection of livelihoods, human rights, and cultural and recreational values;
3) Preservation and protection of ecosystems in water allocation and management systems in order to maintain their ability to deliver and sustain the functioning of essential ecosystem services;
4) Water supplies for socio-economic development and activities (such as energy, transport, industry, tourism);
5) Collection and treatment of used water to protect human life and the environment from pollution;

Key Aspects of Water Security

6) Collaborative approaches to transboundary water resources management within and between countries to promote freshwater sustainability and cooperation;
7) The ability to cope with uncertainties and risks of water-related hazards, such as floods, droughts and pollution, among others; and,
8) Good governance and accountability, and the due consideration of the interests of all stakeholders through: appropriate and effective legal regimes; transparent, participatory and accountable institutions; properly planned, operated and maintained infrastructure; and capacity development.

Sources: Adapted from the UN-Water Concept Note "Water Security – A Working Definition" [internal document, 4th Draft, 2011] and the Ministerial
Declaration of The Hague on Water Security in the 21st Century, Second World Water Forum, 22 March, 2000.

SDG 6 Sustainable Water and Sanitation for All

UN-Water Integrated Monitoring Initiative for SDG 6

6.1.1	Safely managed drinking water services (WHO, UNICEF)**
6.2.1	Safely managed sanitation services and hygiene (WHO, UNICEF)**
6.3.1	Wastewater safely treated (WHO, UN-Habitat, UNSD)**
6.3.2	Good ambient water quality (UNEP)**
6.4.1	Water use efficiency (FAO)*
6.4.2	Level of water stress (FAO)*
6.5.1	Integrated water resources management (UNEP)*
6.5.2	Transboundary basin area with water cooperation (UNECE, UNESCO)*
6.6.1	Water-related ecosystems (UNEP, Ramsar)*
6.a.1	Water- and sanitation-related official development assistance (WHO, OECD)*
6.b.1	Participation of local communities in water and sanitation management (WHO, OECD)*

Go beyond SDG 6: SDG 6 is not the only SDG to include or directly relate to water and sanitation. An effort to include these other targets such as

SDG target 3.3 (water-borne diseases)

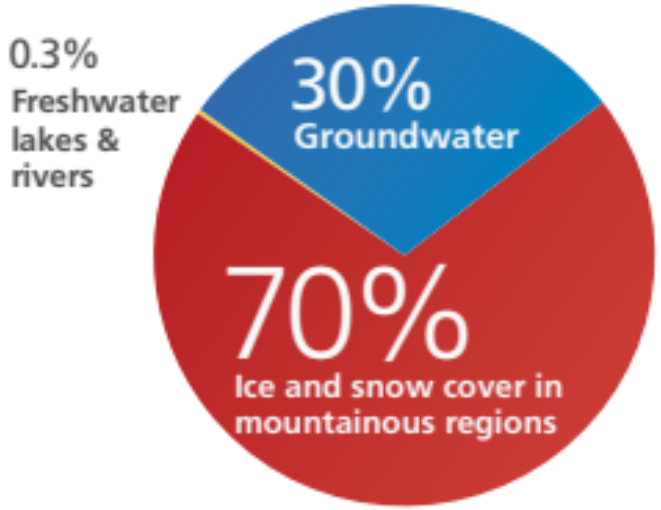
SDG target 11.5 (water-related disasters)

SDG target 13.2 (climate change adaptation)

UN WATER

UN-Water Analytics

Our freshwater resources



Source: World Water Assessment Programme (WWAP)

Abundance of transboundary waters

148 countries include territory within one or more transboundary river basins

39 countries have more than 90% of their territory within one or more transboundary river basins

21 lie entirely within one or more of these watersheds

Source: UNESCO

Improper disposal of industrial waste

In developing countries,

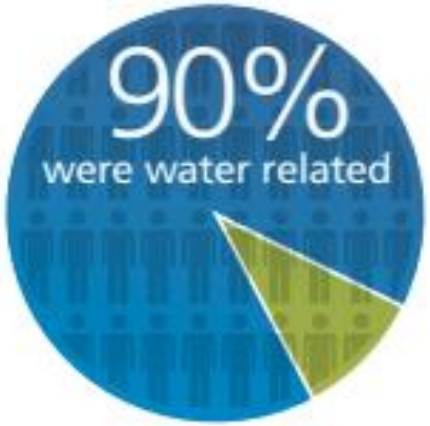
70%

of industrial wastes are dumped untreated into waters where they pollute the usable water supply.

Source:World Water Assessment Programme (WWAP)

High percentage of water-related disasters

Between 1991 and 2000 over 665,000 people died in 2,557 natural disasters of which



Source: WWDR, 2012

SDG 6 : Thailand

Thailand

East and South Asia

Performance by Indicator

6 CLEAN WATER AND SANITATION

Score

78.3

Clean water and sanitation

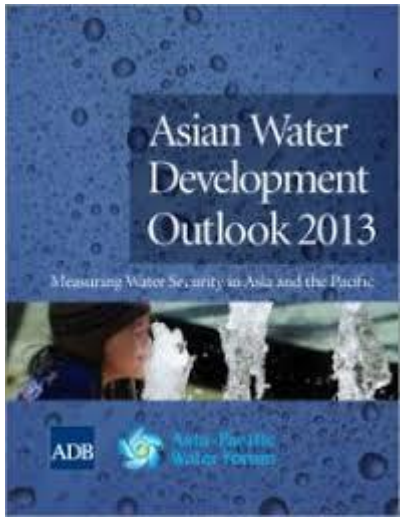
78.3

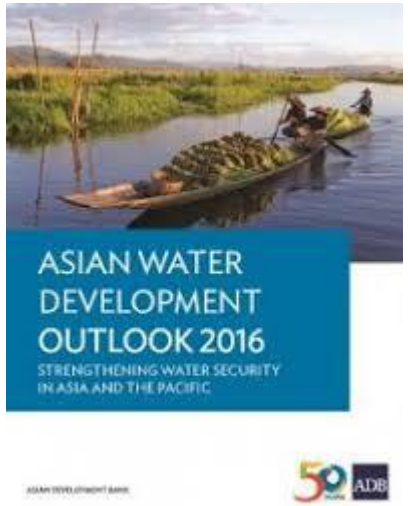
Population using at least basic drinking water services (%)	98.23114483
Population using at least basic sanitation services (%)	95.01129717
Freshwater withdrawal (%)	17.49
Imported groundwater depletion (m3/year/capita)	2.890371459
Wastewater treated (%)	12.1

https://dashboards.sdgindex.org/#/THA

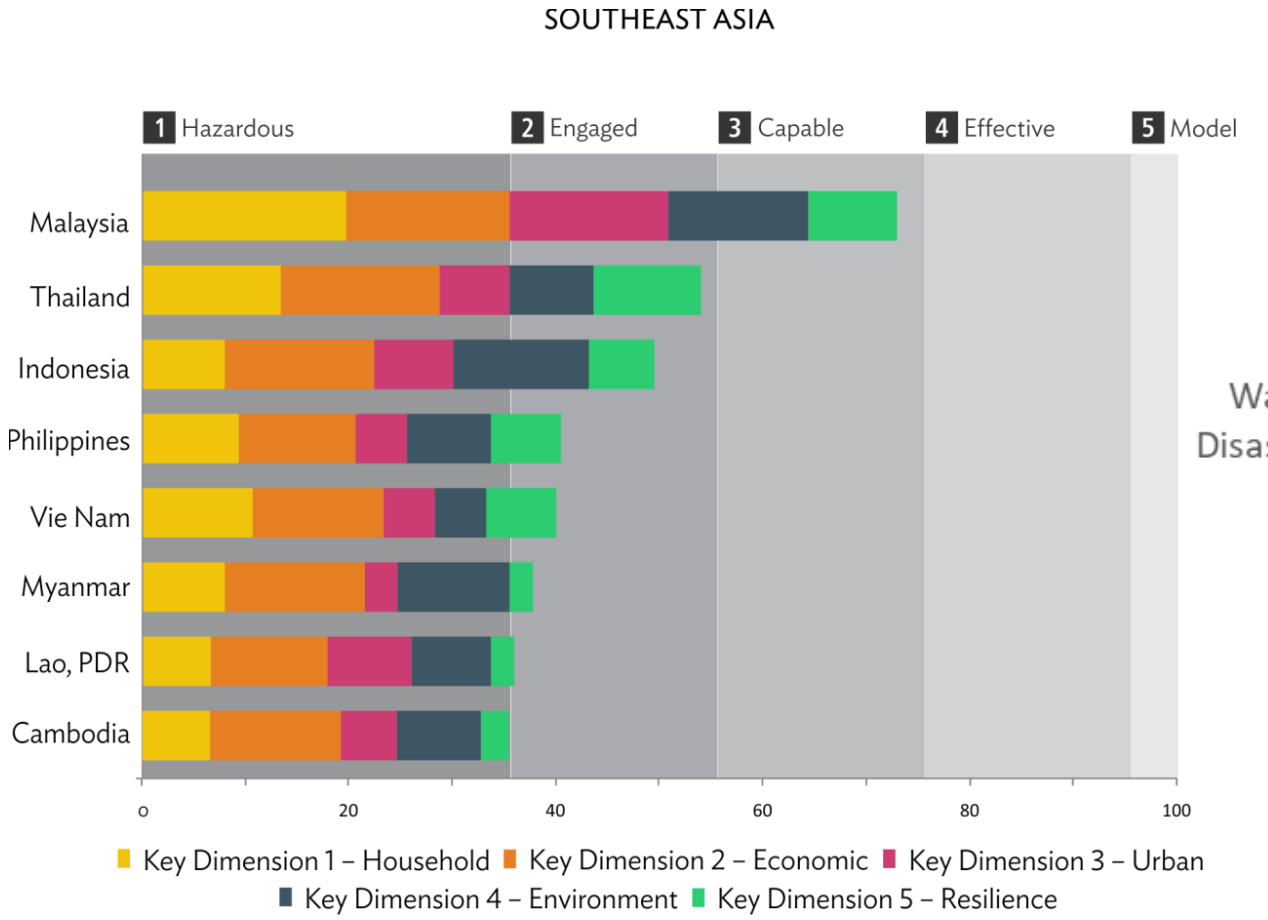
Asian Water Development Outlook 2016

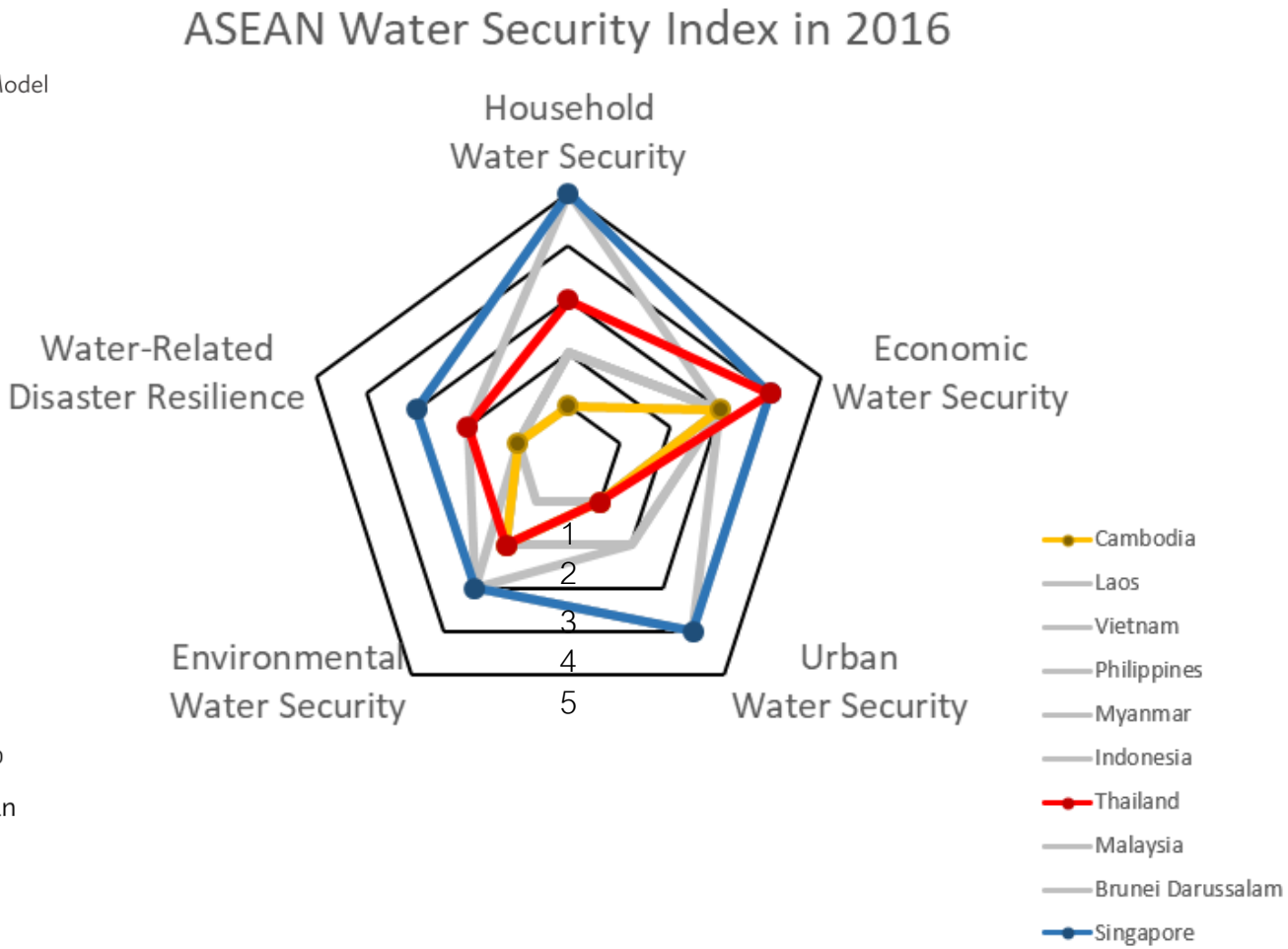
Measuring & strengthening water security in Asia and the Pacific



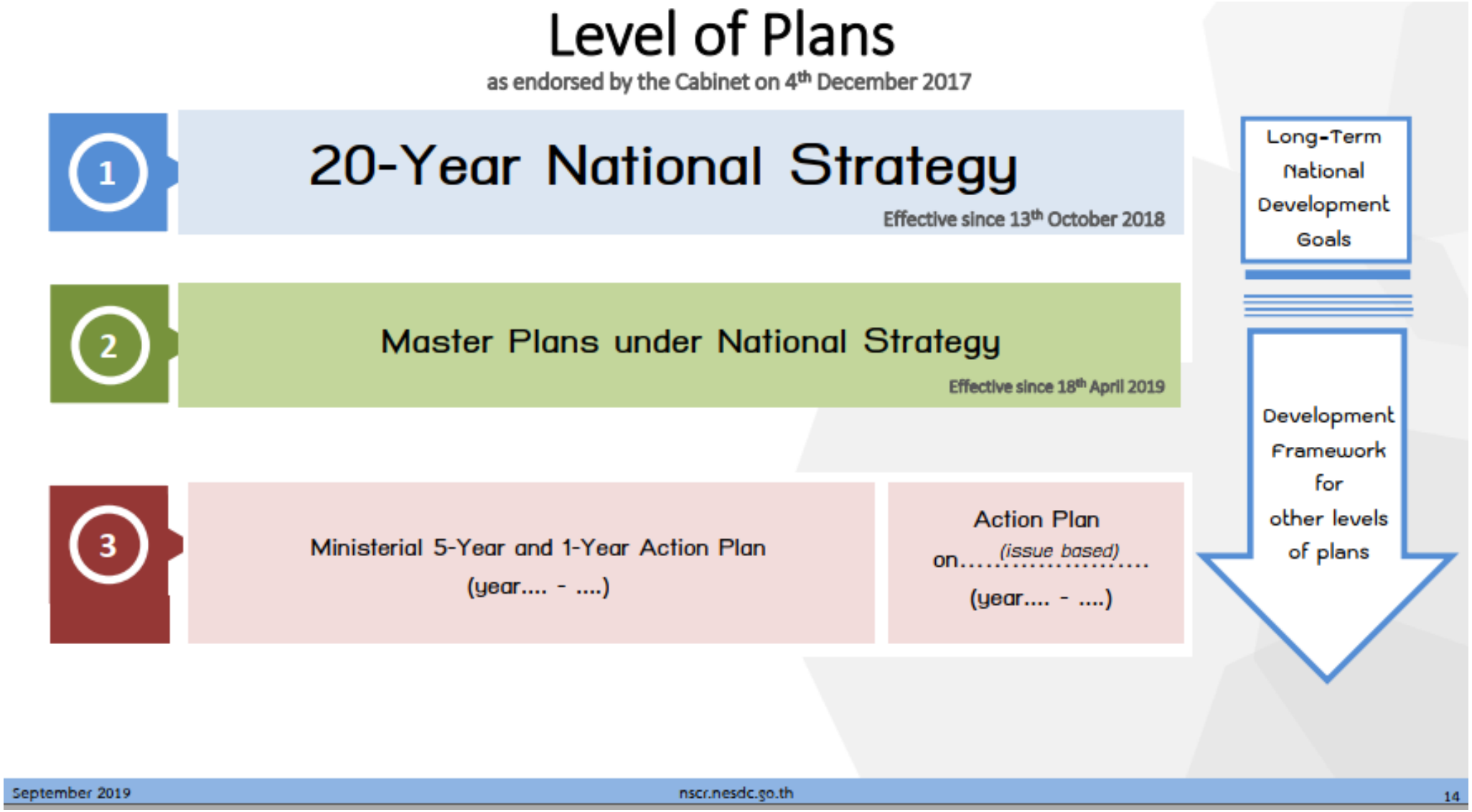


Asian Water Development Outlook 2016





Thailand's National Strategy



Source : NESDC (2019)

แผนระดับ 2 แผนแม่บทภายใต้ยุทธศาสตร์ชาติ (พ.ศ. 2561 – 2580)

ประเด็นที่ (19) ประเด็นการบริหารจัดการน้ำทั้งระบบ สำนักงานสภาพัฒนาการเศรษฐกิจและสังคมแห่งชาติ (สศช.)

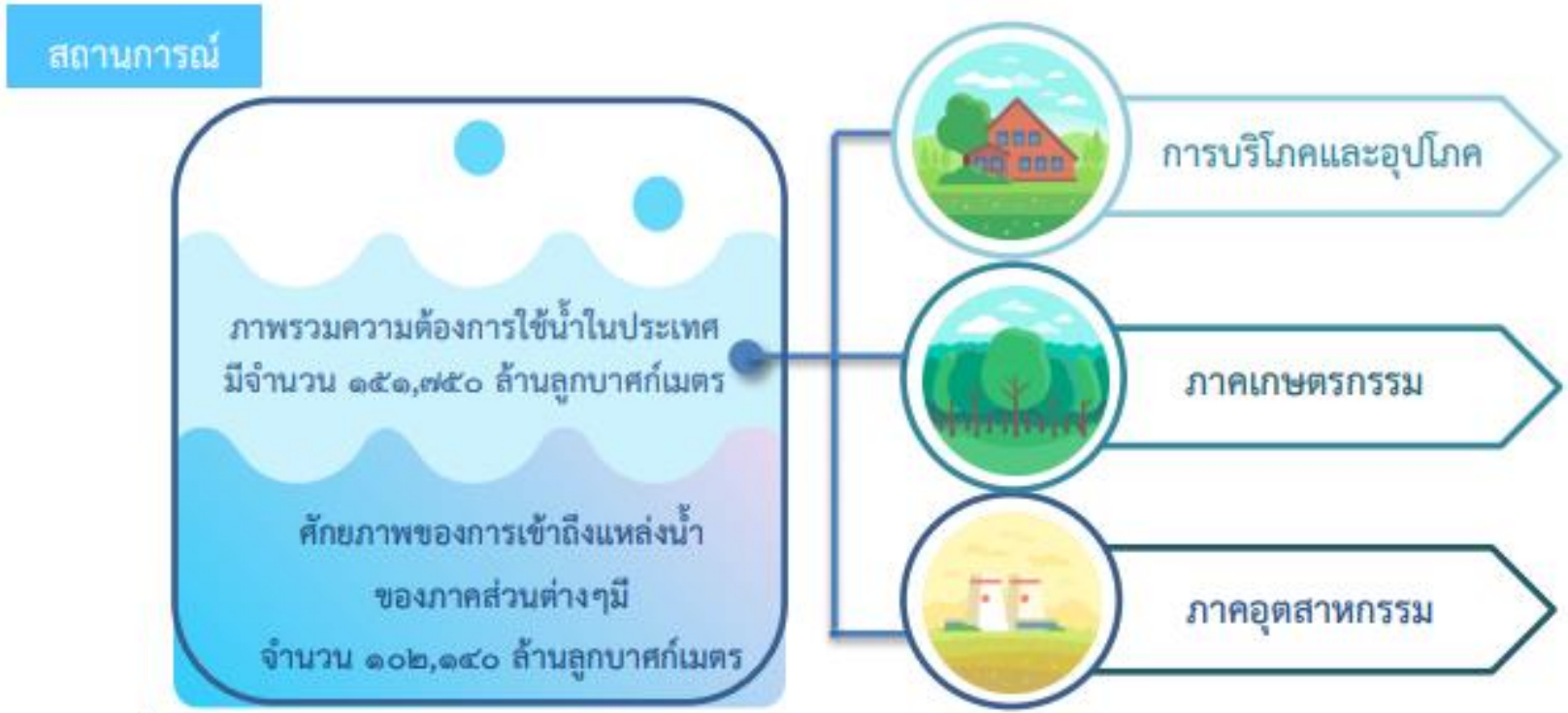
แผนแม่บทภายใต้ยุทธศาสตร์ชาติ ประเด็นที่ (19) ประเด็นการบริหารจัดการน้ำทั้งระบบ

สำนักงานสภาพัฒนาการเศรษฐกิจและสังคมแห่งชาติ (สศช.)

๑. ความมั่นคงด้านน้ำของประเทศเพิ่มขึ้น

๒. ผลิตภาพของน้ำทั้งระบบเพิ่มขึ้น ในการใช้น้ำอย่างประหยัดและสร้างมูลค่าเพิ่มจากการใช้น้ำ

๓. แม่น้ำลำคลองและแหล่งน้ำธรรมชาติได้รับการอนุรักษ์และฟื้นฟูสภาพให้มีระบบนิเวศที่ดี



ที่มา : สำนักงานสภาพัฒนาการเศรษฐกิจและสังคมแห่งชาติ (สศช.)

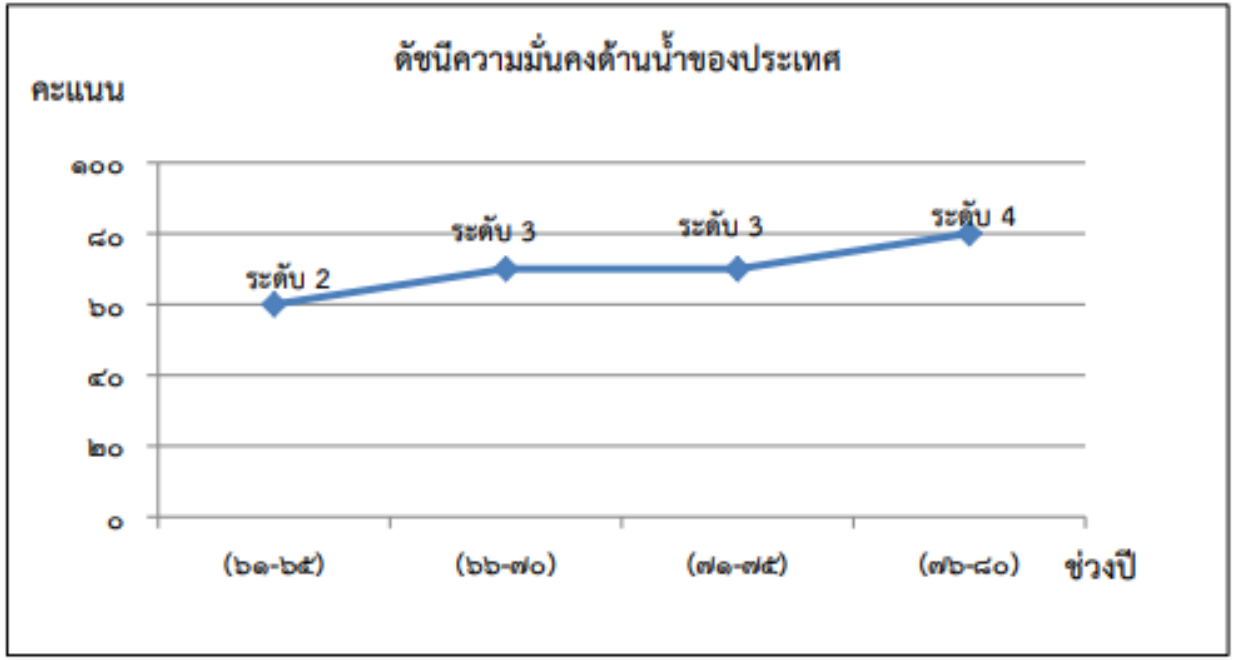
แผนแม่บทภายใต้ยุทธศาสตร์ชาติ ประเด็นที่ (19) ประเด็นการบริหารจัดการน้ำทั้งระบบ

สำนักงานสภาพัฒนาการเศรษฐกิจและสังคมแห่งชาติ (สศช.)

๑. ความมั่นคงด้านน้ำของประเทศเพิ่มขึ้น

ตัวชี้วัดแผนย่อยพัฒนาการจัดการน้ำเชิงลุ่มน้ำทั้งระบบ เพื่อเพิ่มความมั่นคงด้านน้ำของประเทศประกอบด้วย

- ดัชนีความมั่นคงด้านน้ำอุปโภคบริโภค
- ดัชนีความมั่นคงด้านน้ำเพื่อสิ่งแวดล้อม
- ดัชนีการรับมือกับพิบัติภัยด้านน้ำ
- สัดส่วนความเสียหายจากภัยพิบัติด้านน้ำเทียบกับกรณีปกติ (ร้อยละของกรณีปกติ)
- ดัชนีธรรมาภิบาลในการบริหารจัดการน้ำ



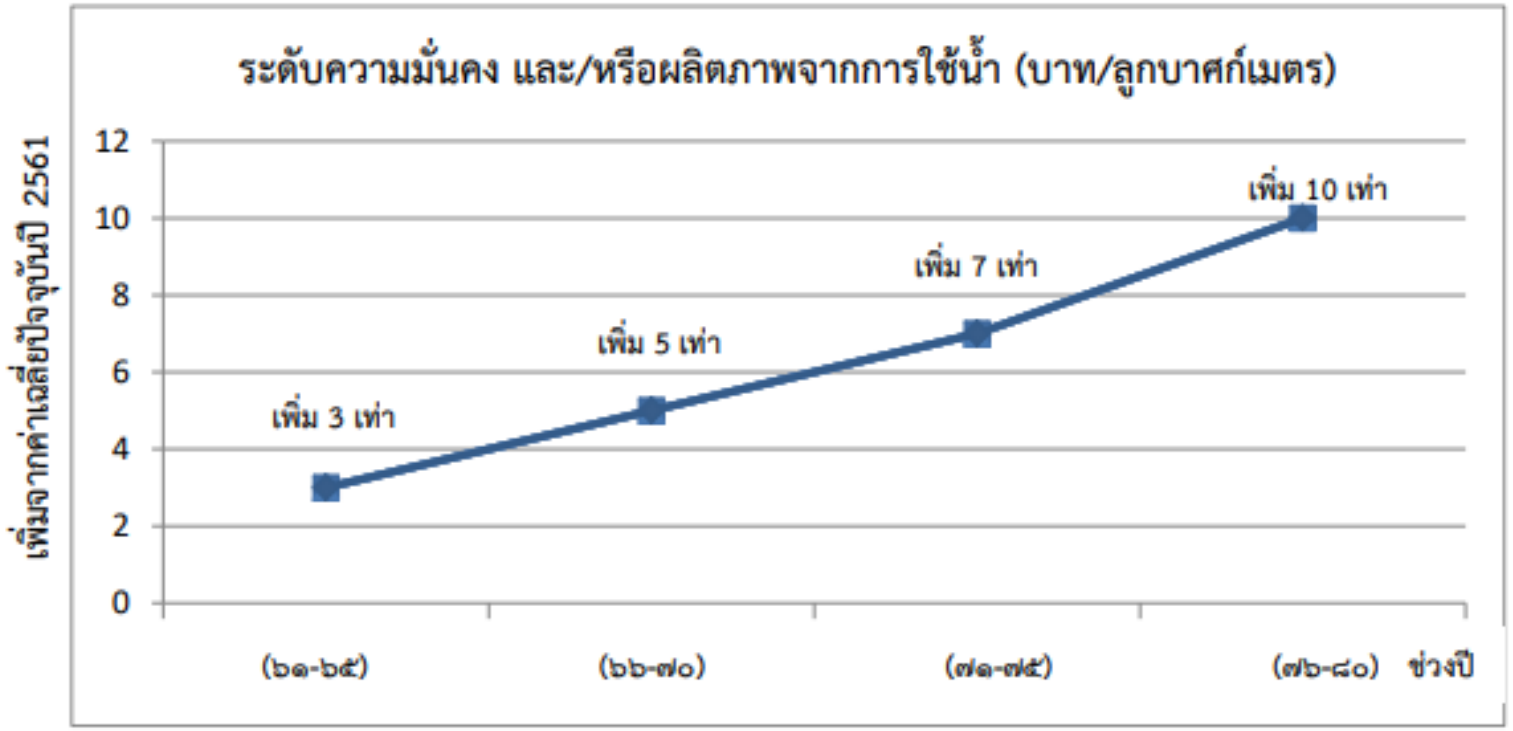
อ้างอิงธนาคารพัฒนาเอเชีย (Asia Development Bank)

แผนแม่บทภายใต้ยุทธศาสตร์ชาติ ประเด็นที่ (19) ประเด็นการบริหารจัดการน้ำทั้งระบบ

สำนักงานสภาพัฒนาการเศรษฐกิจและสังคมแห่งชาติ (สศช.)

๒. ผลิตภาพของน้ำทั้งระบบเพิ่มขึ้นในการใช้น้ำอย่างประหยัดและสร้างมูลค่าเพิ่มจากการใช้น้ำ

- ดัชนีความมั่นคงด้านน้ำในเขตเมือง
- ดัชนีความมั่นคงด้านน้ำเพื่อการพัฒนาเศรษฐกิจ
- ผลิตภาพจากการใช้น้ำ (บาท/ลูกบาศก์เมตร)

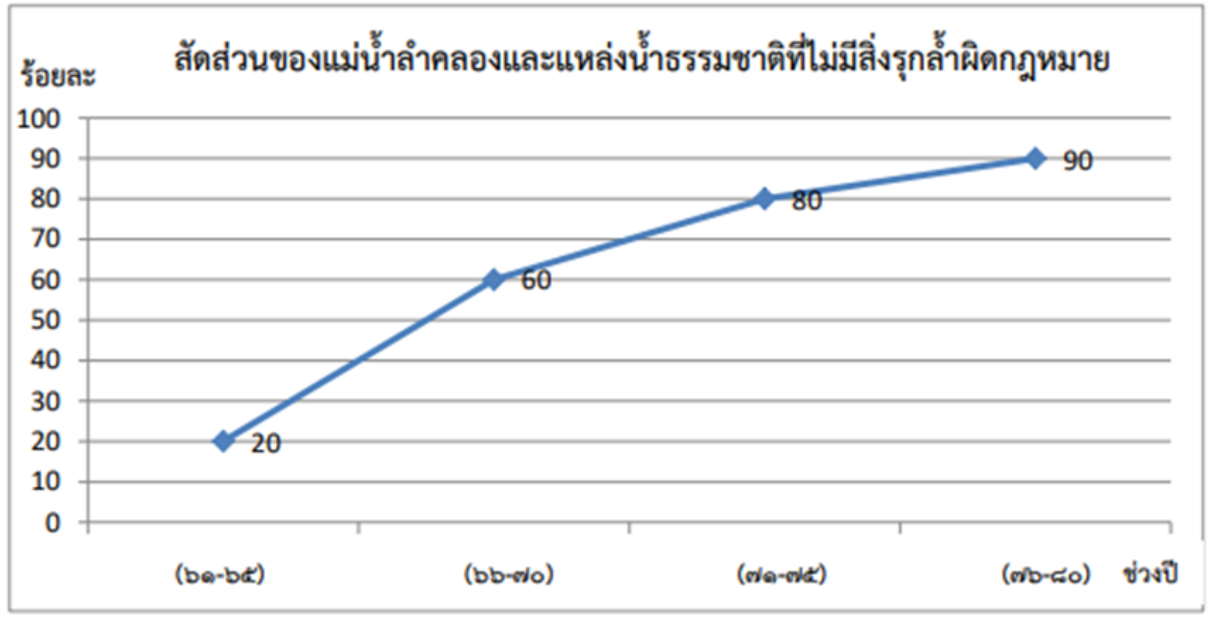


ปัจจุบันค่าเฉลี่ยของผลิตภาพจากการใช้น้ำในปี พ.ศ. ๒๕๖๑ มีค่าประมาณ ๑๕๐ บาท/ลบ.ม.

- ภาคการเกษตร ๑๔.๗ บาท/ลบ.ม.
- ภาคอุตสาหกรรม ๑๖๐๐ บาท/ลบ.ม.
- ภาคบริการ ๕๑๙๐ บาท/ลบ.ม.

๓. แม่น้ำลำคลองและแหล่งน้ำธรรมชาติได้รับการอนุรักษ์และฟื้นฟูสภาพให้มีระบบนิเวศที่ดี

- สัดส่วนพื้นที่ลำคลองที่ได้รับการฟื้นฟู
- สัดส่วนพื้นที่ลำน้ำที่ได้รับการฟื้นฟู (ร้อยละของพื้นที่เป้าหมาย)
- สัดส่วนพื้นที่ชุ่มน้ำและแหล่งน้ำที่ได้รับการฟื้นฟู (ร้อยละของพื้นที่เป้าหมาย)
- สัดส่วนพื้นที่ชุมชน (นอกเขตกทม.ที่เป็นชุมชนขนาดใหญ่) ริมแม่น้ำ ลำคลอง และแหล่งน้ำธรรมชาติ (ร้อยละของพื้นที่เป้าหมาย)



แผนระดับ 3 แผนแม่บทการบริหารจัดการทรัพยากรน้ำ 20 ปี (พ.ศ. 2561 – 2580)

สำนักงานทรัพยากรน้ำแห่งชาติ

วิสัยทัศน์การพัฒนาตามแผนแม่บทการบริหารจัดการทรัพยากรน้ำ ๒๐ ปี (พ.ศ. ๒๕๖๑-๒๕๘๐)

“ทุกหมู่บ้านมีน้ำสะอาดอุปโภค บริโภค น้ำเพื่อการผลิตมั่นคง ความเสียหายจาก อุทกภัยลดลง คุณภาพน้ำอยู่ในเกณฑ์มาตรฐาน บริหารจัดการน้ำอย่างยั่งยืน ภายใต้การพัฒนาอย่างสมดุล โดยการมีส่วนร่วมของทุกภาคส่วน”

- **ด้านที่ 1 การจัดการน้ำอุปโภคบริโภค**
- **ด้านที่ 2 การสร้างความมั่นคงของน้ำภาคการผลิต**
- **ด้านที่ 3 ด้านการจัดการน้ำท่วมและอุทกภัย**
- **ด้านที่ 4 ด้านการจัดการคุณภาพน้ำและอนุรักษ์ทรัพยากรน้ำ**
- **ด้านที่ 5 การอนุรักษ์ฟื้นฟูสภาพป่าต้นน้ำที่เสื่อมโทรมและป้องกันการพังทลายของดิน**
- **ด้านที่ 6 การบริหารจัดการ**

Research Roles

Research Project funded by
Thailand Science Research and Innovation (TSRI)

Analysis of water security, water productivity and water-related disaster for water resources master plan

Time period: August 2018 – August 2019

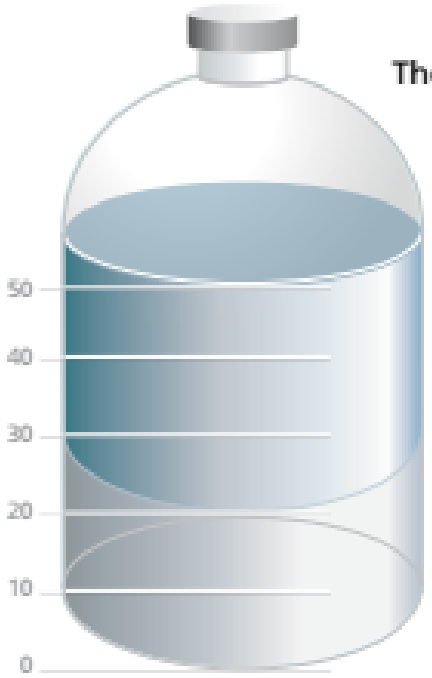
Research Team

Dr. Piyatida Ruangrassamee Dept. of Water Resources Engineering, Chulalongkorn University	**Principal investigator (KD1 & KD3)**
Dr. Man Purotaganon Global Water Partnership	**Water governance**
Dr. Kwanrawee Sirikanchana Laboratory of Biotechnology, Chulabhorn Research Institute	**KD4**
Dr. Pongsak Suttinon Dept. of Water Resources Engineering, Chulalongkorn University **Mr. Sak Sakulthai** Water Resources System Research Unit, Chulalongkorn University	**KD5**
Dr. Chokchai Suthidhummajit Water Resources System Research Unit, Chulalongkorn University	**KD2**

Key Dimension 1: Household Water Security

Provision of safe water and sanitation for all people

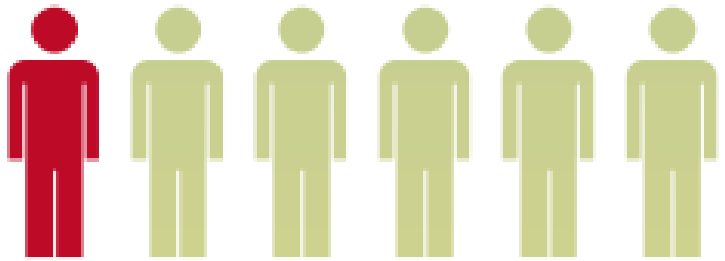
Water requirements for our basic needs



The UN suggests that each person needs **20-50 litres** of water a day to ensure their basic needs for drinking, cooking and cleaning.

Source: World Water Assessment Programme (WWAP)

Access to improved drinking water



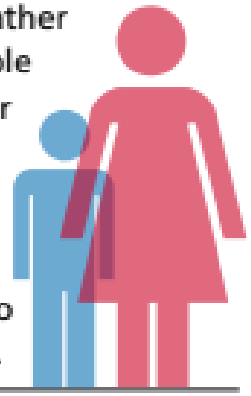
One in 6 people worldwide - 783 million - don't have access to improved drinking water sources.

Source: World Health Organization (WHO) and United Nations Children Fund (UNICEF) Joint Monitoring Programme on Water Supply and Sanitation (JMP)

Decrease in education time

As it takes more time to gather water and fuel, the available time for education or other economic and political activities decreases.

Already, the majority of children worldwide who do not attend school are **girls**.



Source: UN Women

Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP)

WHO and UNICEF

JMP normative interpretation of terms used in SDG target 6.1

Target language	Normative interpretation
By 2030, achieve	
universal	Implies all exposures and settings, including households, schools, health facilities, workplaces and public spaces
and ***equitable***	Implies progressive reduction and elimination of inequalities between population subgroups
access	Implies sufficient water to meet domestic needs is reliably available close to home
to ***safe***	Safe drinking water is free from pathogens and elevated levels of toxic substances at all times
and ***affordable***	Payment for services does not present a barrier to access or prevent people from meeting other basic human needs
drinking water	Water used for drinking, cooking, food preparation and personal hygiene
for all	Suitable for use by men, women, girls and boys of all ages, including people with disabilities

Service Level

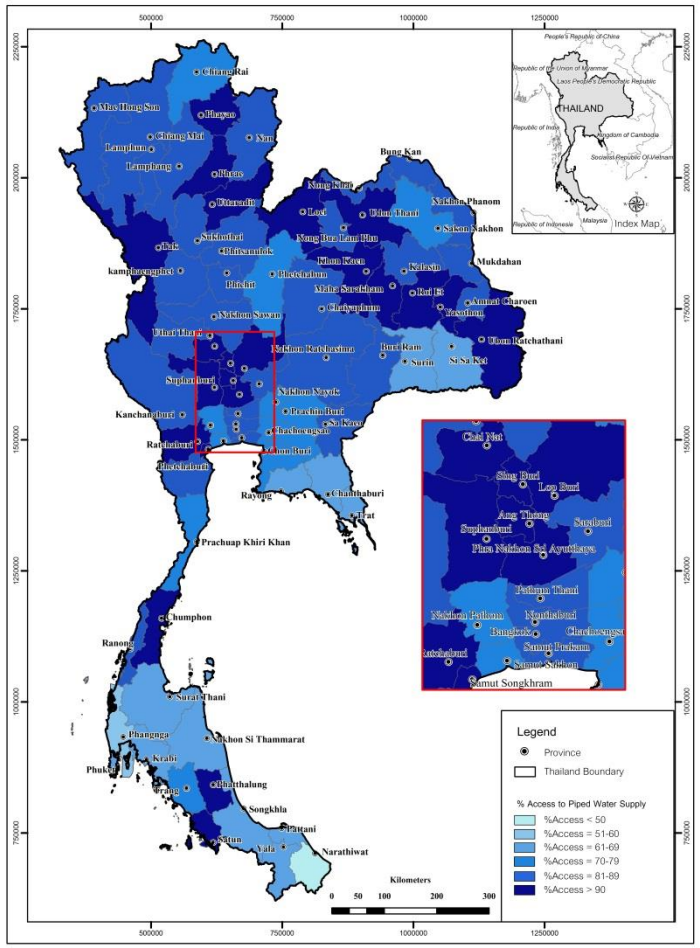
The new JMP ladder for household drinking water services

Service level	Definition
Safely managed	Drinking water from an improved water source which is located on premises, available when needed and free of faecal and priority chemical contamination
Basic	Drinking water from an improved source provided collection time is not more than 30 minutes for a roundtrip including queuing
Limited	Drinking water from an improved source where collection time exceeds over 30 minutes for a roundtrip to collect water, including queuing
Unimproved	Drinking water from an unprotected dug well or unprotected spring
No service	Drinking water collected directly from a river, dam, lake, pond, stream, canal or irrigation channel

FIGURE 1 JMP service ladder for household drinking water

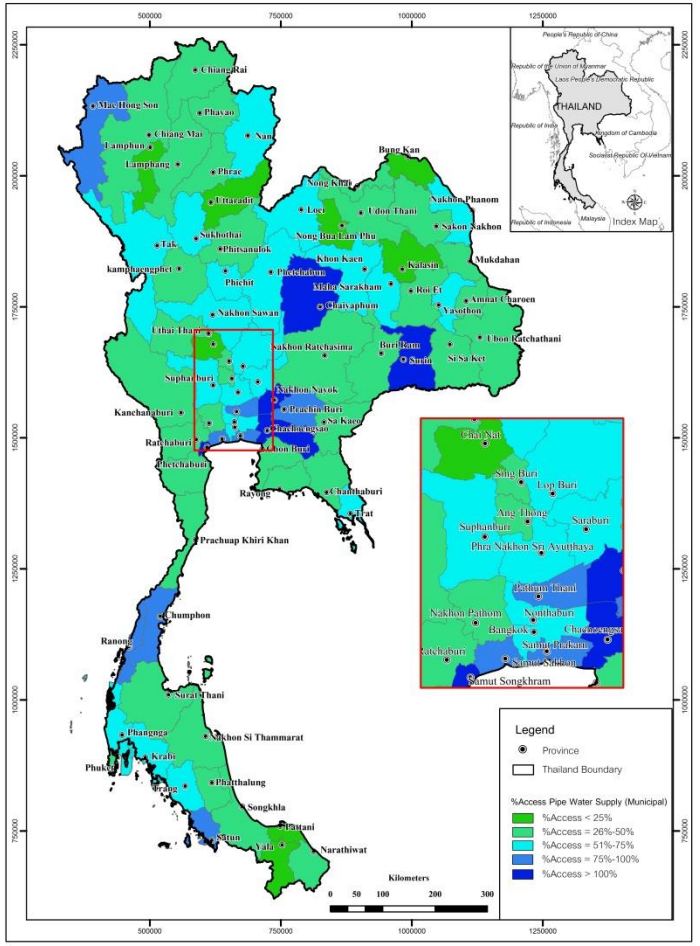
Household Water Security (research)

% Households with access to village water supply



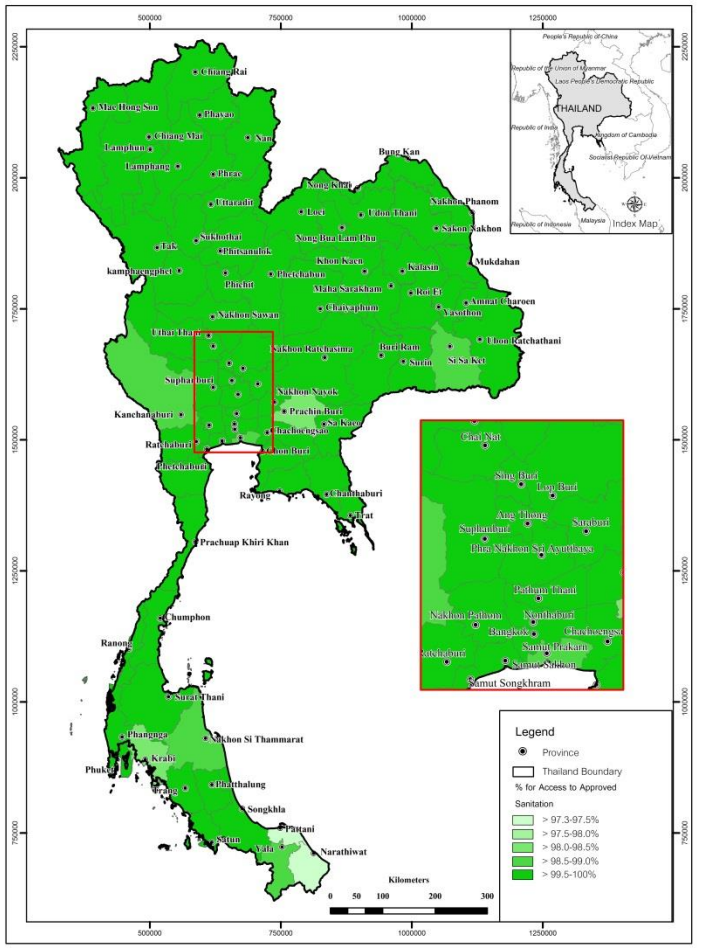
Source: Department of Local Administration

% Households in municipality with piped water supply



Source: Provincial Waterworks Authority and Metropolitan Waterworks Authority

% Households with sanitation

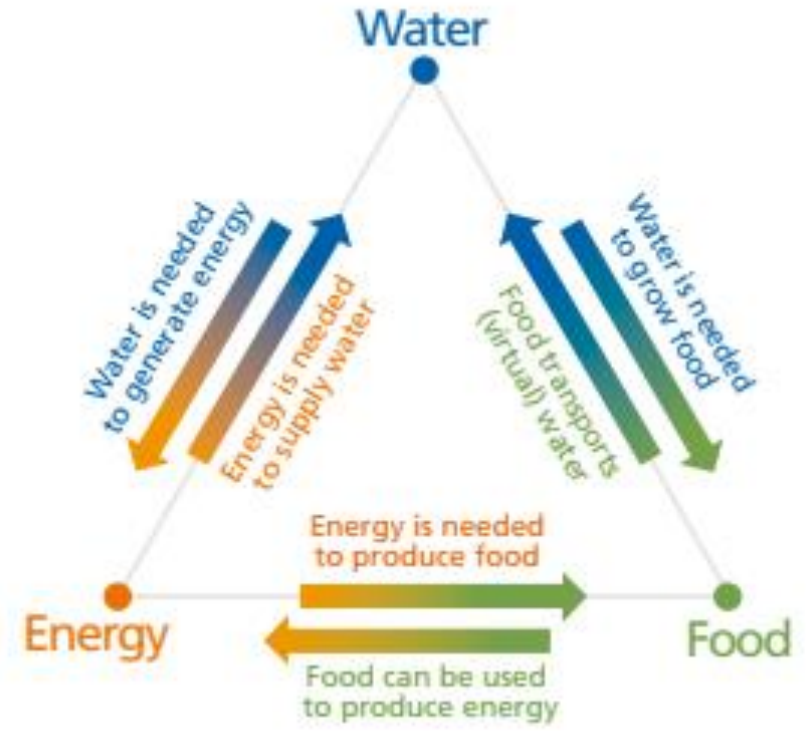


Source: National Statistical Office

Key Dimension 2: Economic Water Security

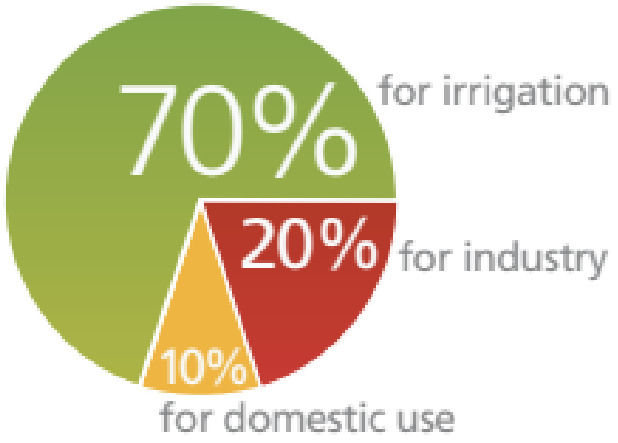
KD2 Measures the productive use of water to sustain economic growth in food production, industry and energy sectors

Figure 1. The Water-Food-Energy Nexus



Adapted from: Water - A Global Innovation Outlook Report, IBM, 2009

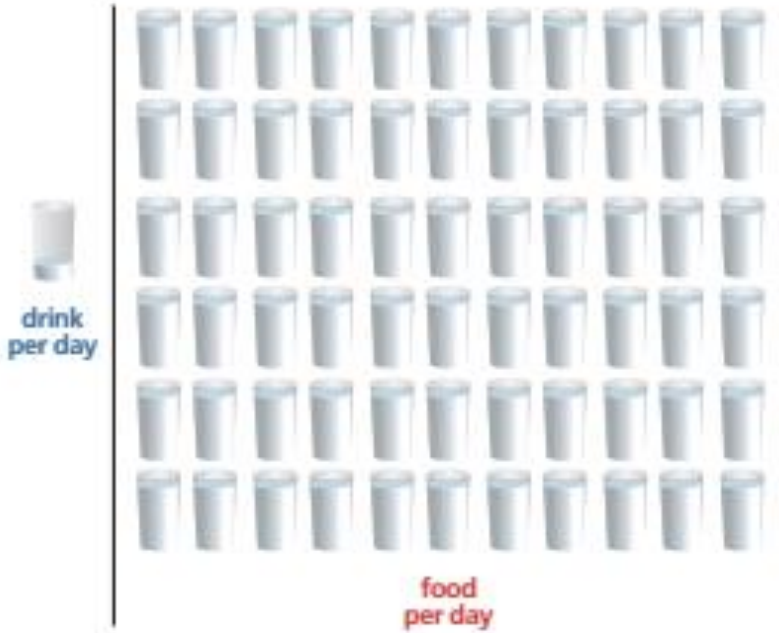
Global water use



Source: World Water Assessment Programme (WWAP)

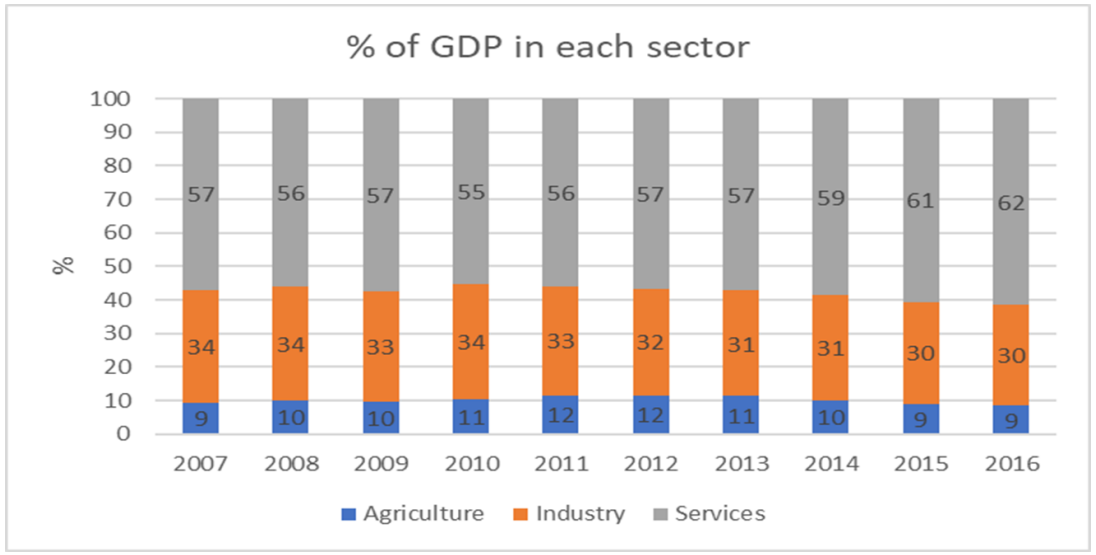
Daily water requirement

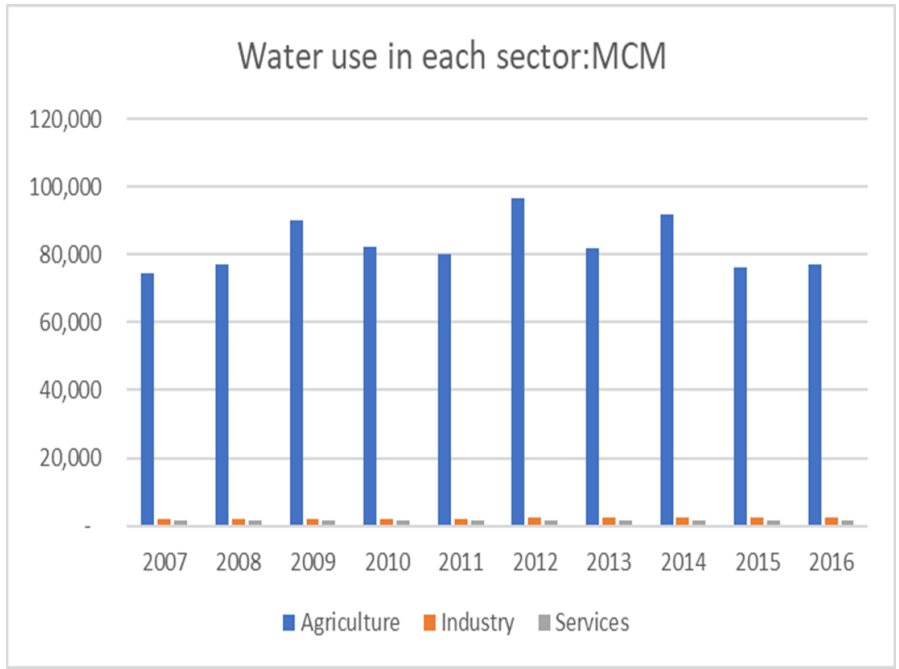
The daily drinking water requirement per person is 2-4 litres, but it takes 2,000 to 5,000 litres of water to produce one person's daily food.



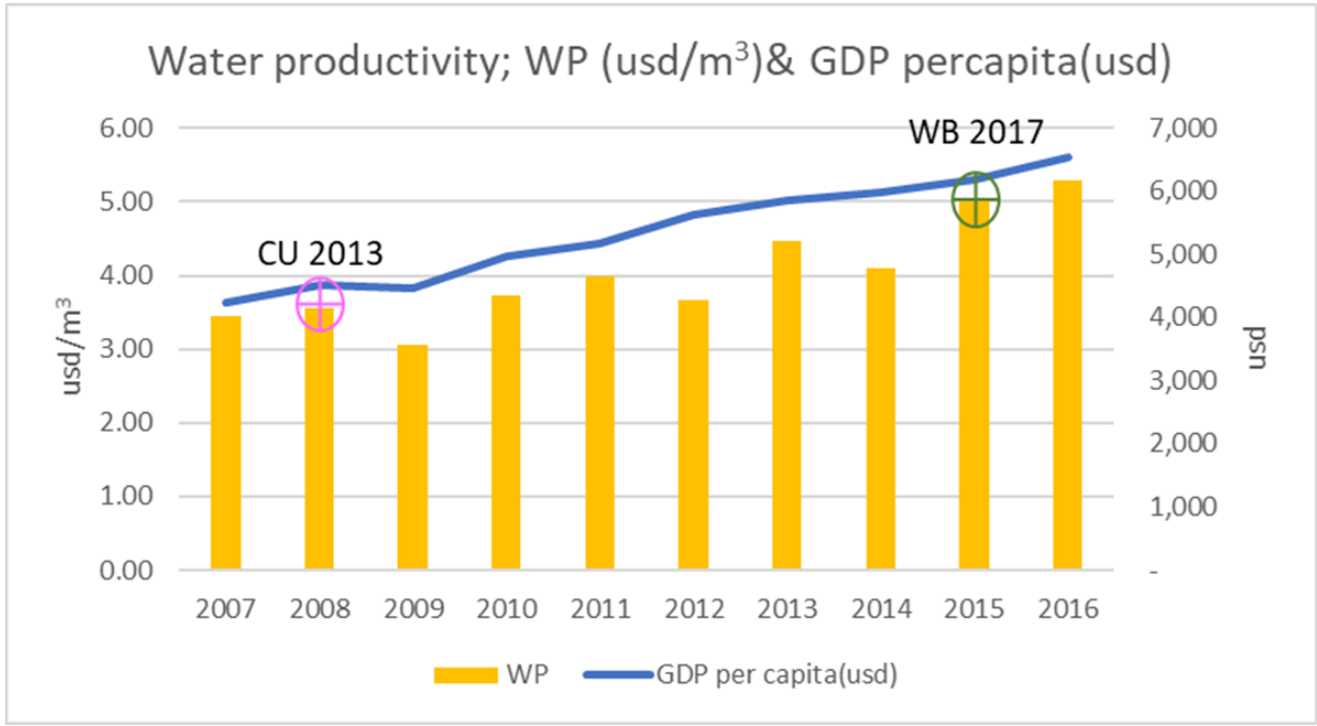
Source: Food and Agriculture Organization of the United Nations (FAO)

Water productivity (research)

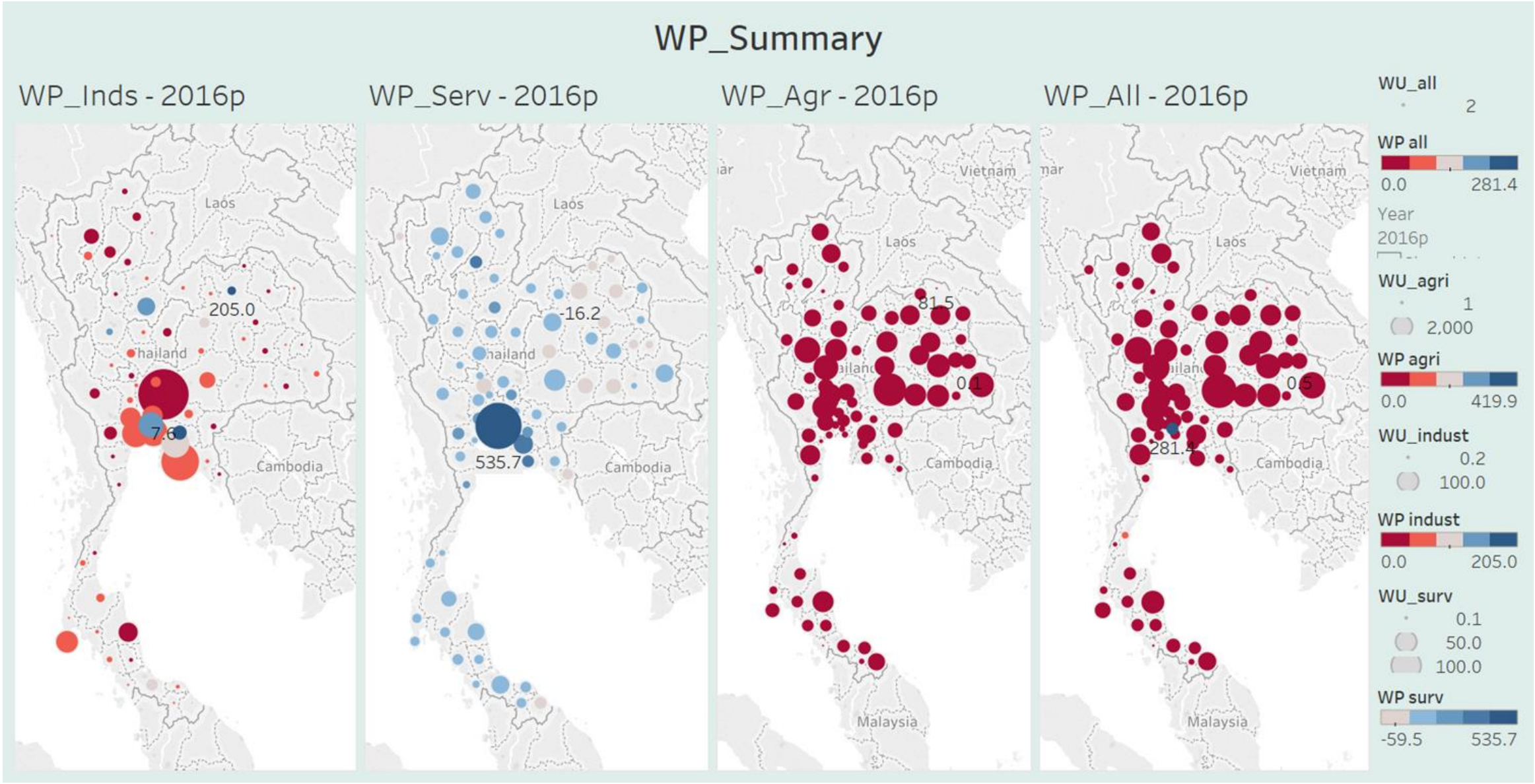




Water productivity = GDP by sector / water use by sector



Provincial water productivity in 2016 (research)

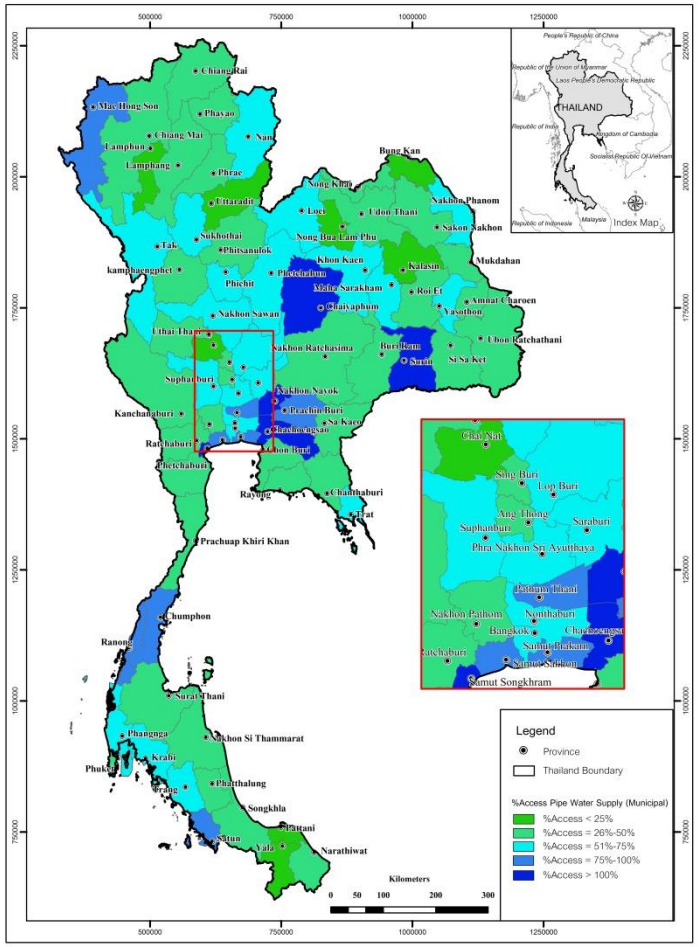


Key Dimension 3: Urban Water Security

To describe progress countries are making to provide better urban water services and management in order to develop vibrant, livable cities and towns

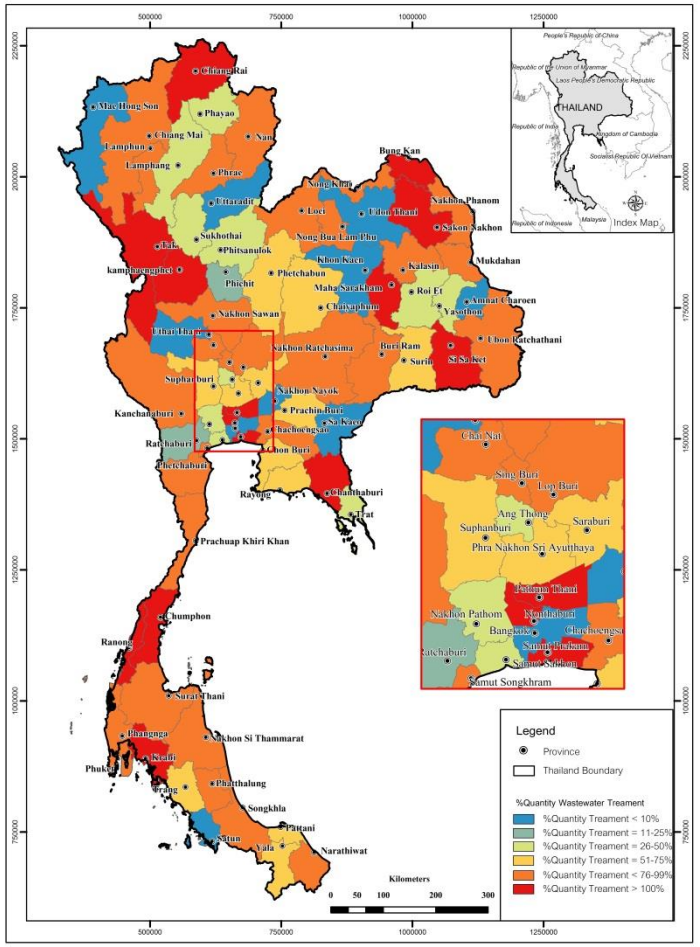
Urban Water Security (research)

% Households in municipality with piped water supply



Source: Provincial Waterworks Authority and Metropolitan Waterworks Authority

% Wastewater treatment



Source: Department of Local Administration

Key Dimension 4: Environmental Water Security

Country's ability to develop and manage river basins, and sustain ecosystems services

Our freshwater resources

The total volume of water on Earth is about 1.4 billion km³. The volume of freshwater resources is around 35 million km³, or about 2.5 percent of the total volume.

Source: United Nations Environment Programme (UNEP)

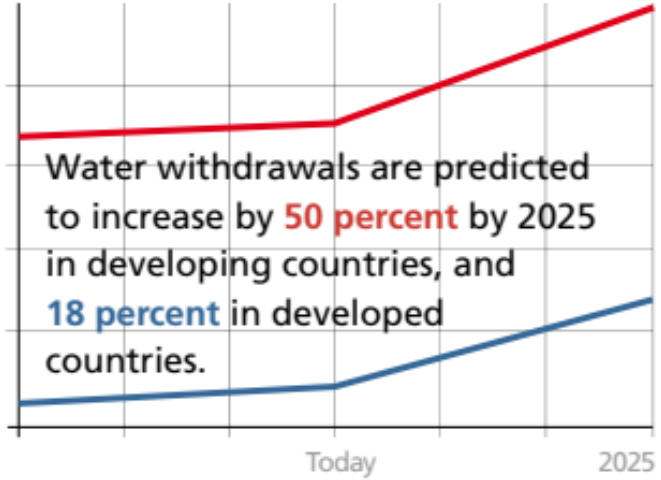
Freshwater availability is limited

The total usable freshwater supply for ecosystems and humans is about 200,000 km³

less than 1 percent of all freshwater resources

Source:United Nations Environment Programme (UNEP)

Water withdrawals



Source: Global Environment Outlook: Environment for Development (GEO-4)

Environmental Water Security (research)

Thailand State of Pollution Report (PCD, 2014)

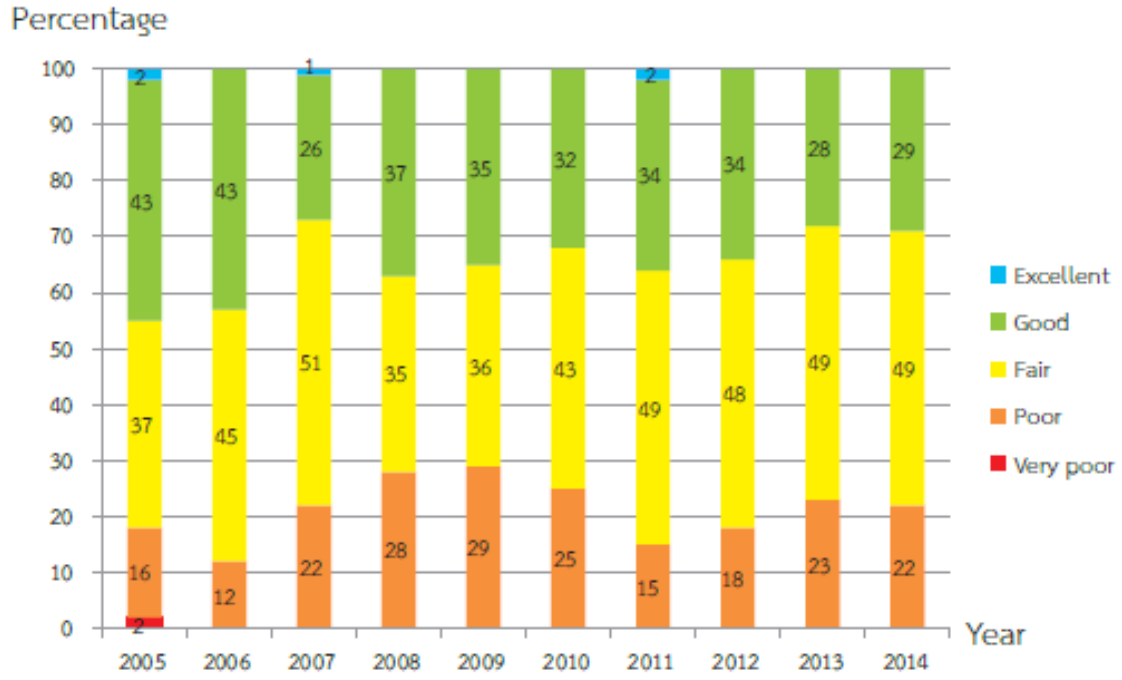
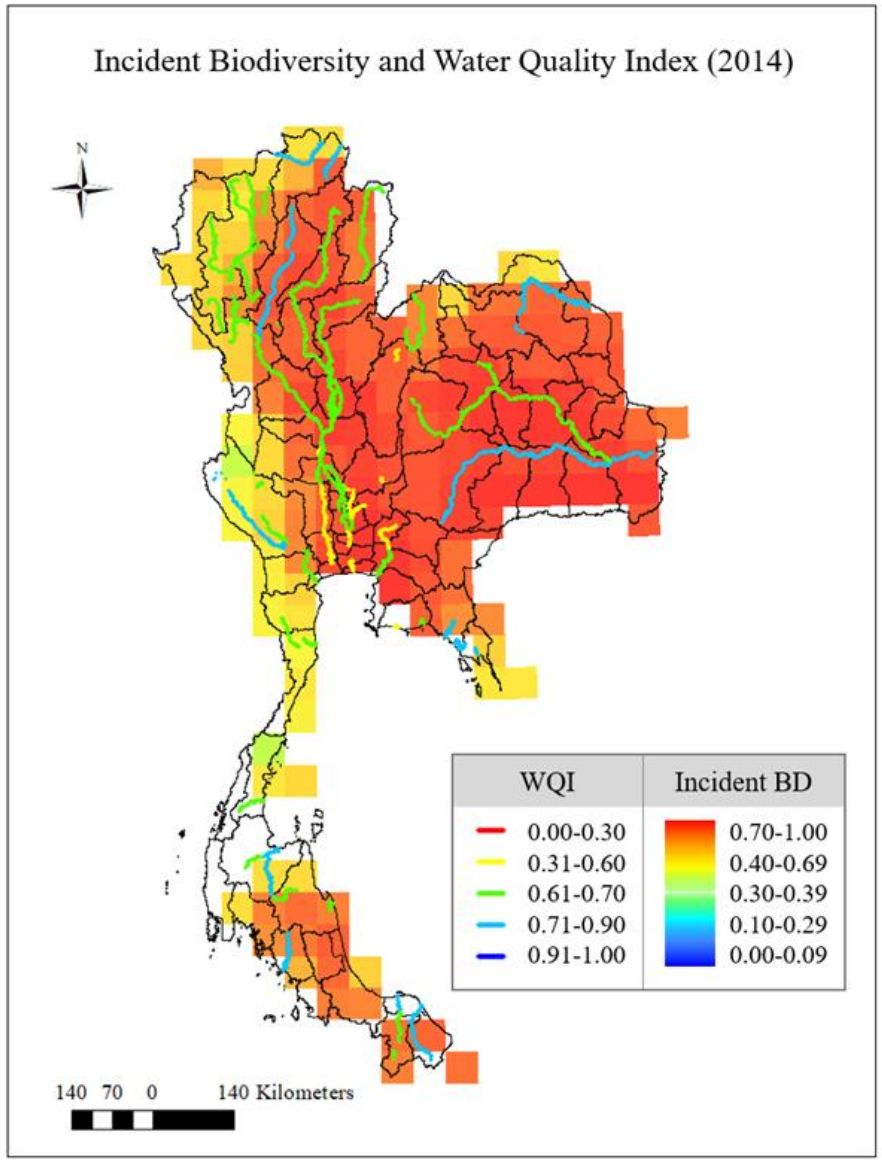


Figure 2-2 Surface Water Quality Trends 2005-2014

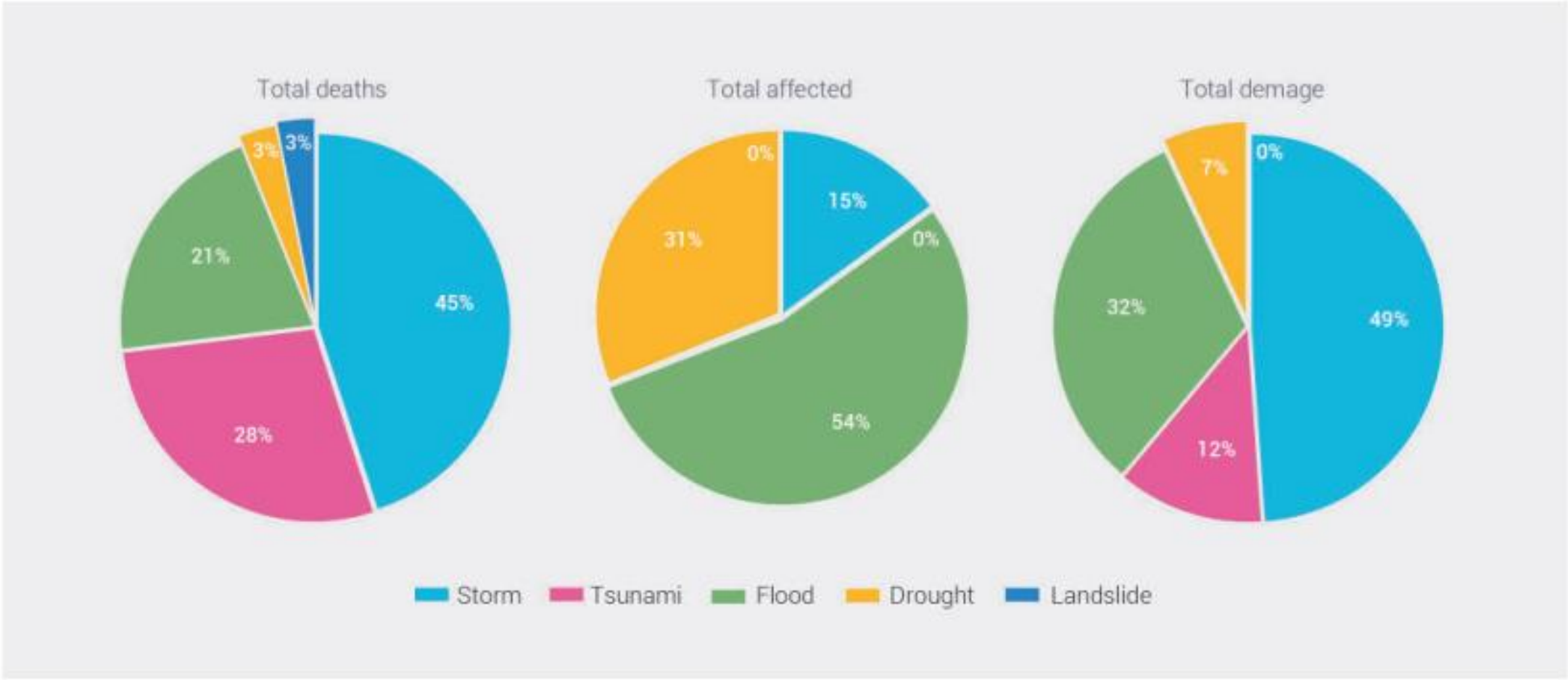


(Vorosmarty et al., 2010 and PCD, 2014)

Key Dimension 5: Resilience to Water-Related Disasters

Capacity of a country to cope with and recover rom impacts of water related disasters

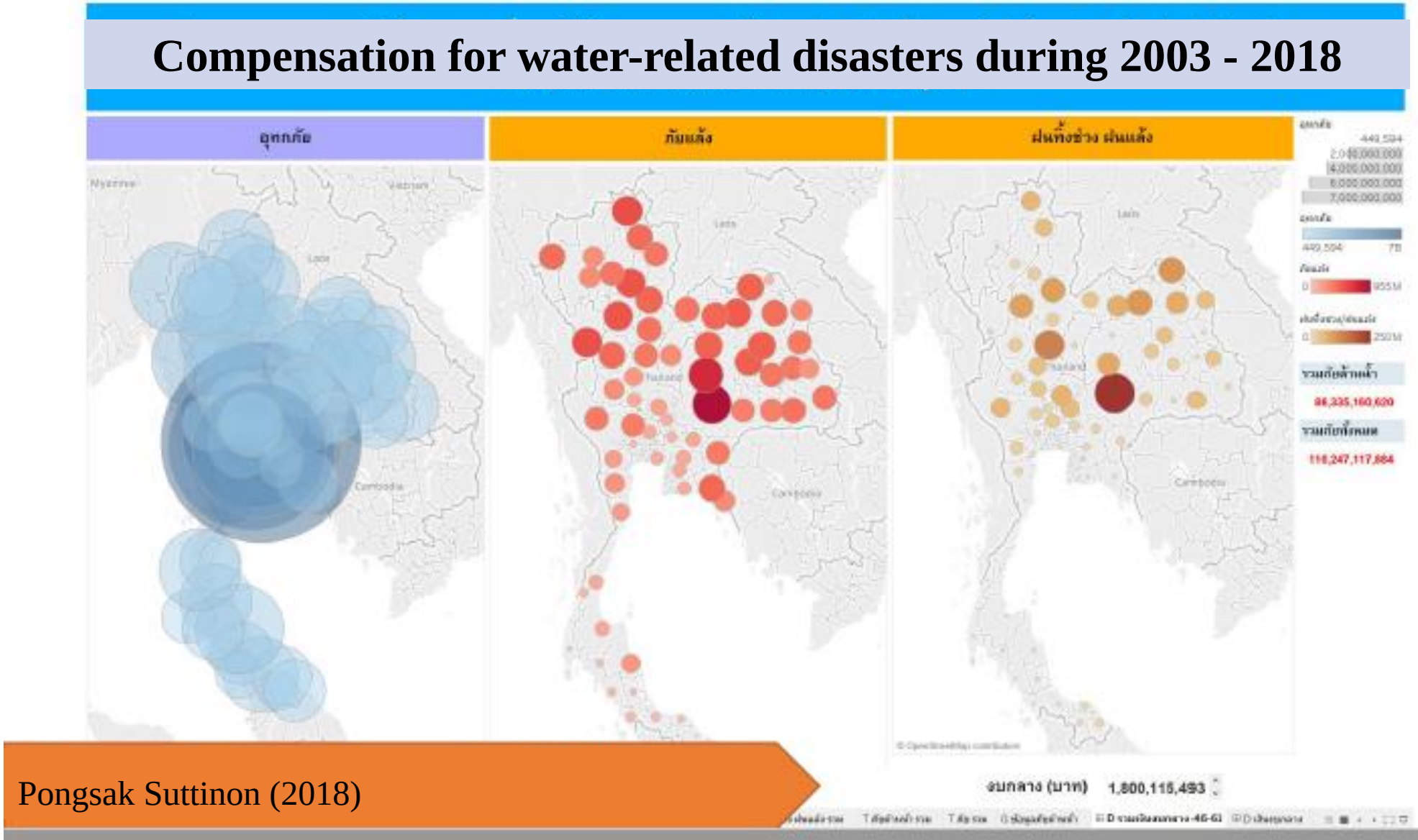
Figure 36. Disaster mortality (left), directly affected people (middle) and damage by water-related hazards (right), 1990–2015



Data source: CRED (n.d.).

Compensation for water-related disasters

Data from Department of Disaster Prevention and Mitigation Department

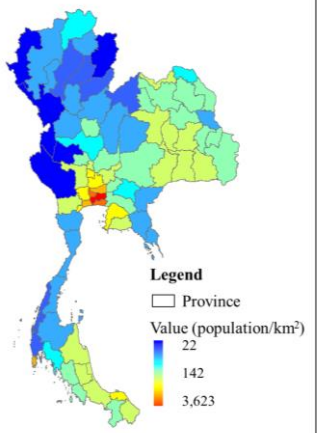


Pongsak Suttinon (2018)

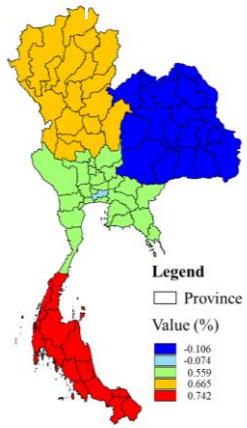
Resilience to Water-Related Disasters (research)

Exposure

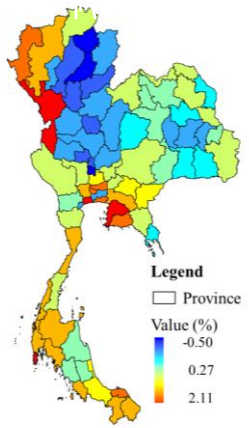
Population



Urban Growth

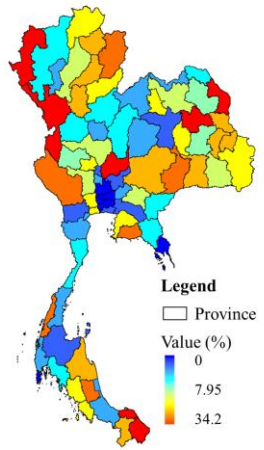


Pop. Growth

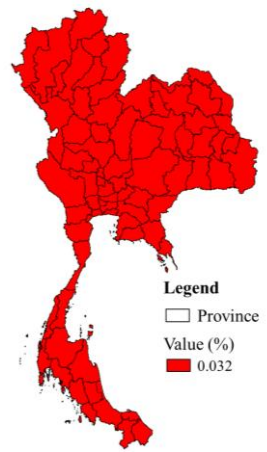


Vulnerability

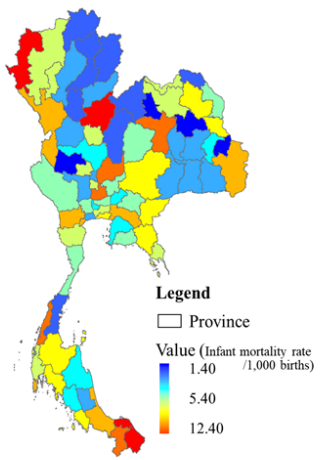
Poverty



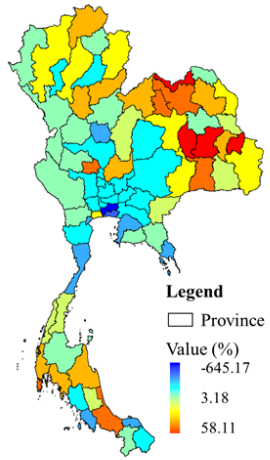
% Net ODA to gross income



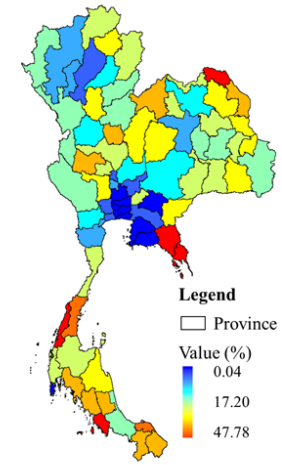
Infant mortality rate / 1,000 births



Deforestation Rate



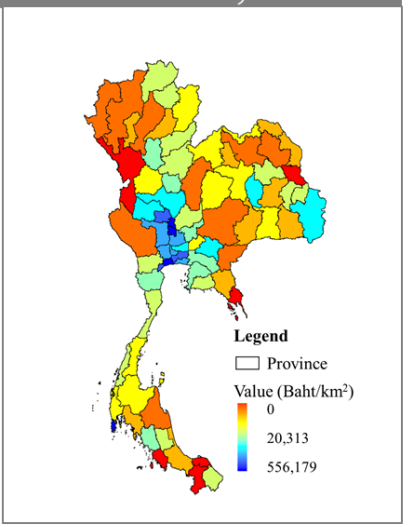
Agricultural part of GPP



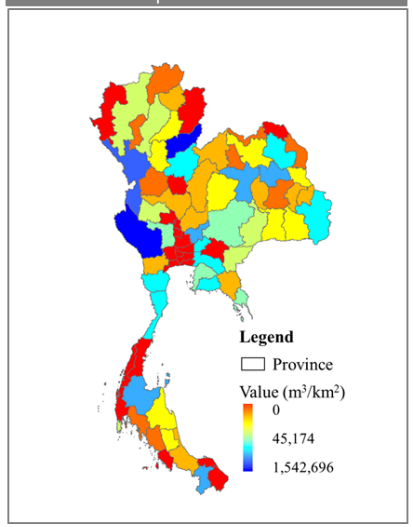
Resilience to Water-Related Disasters (research)

Hard Coping Capacity

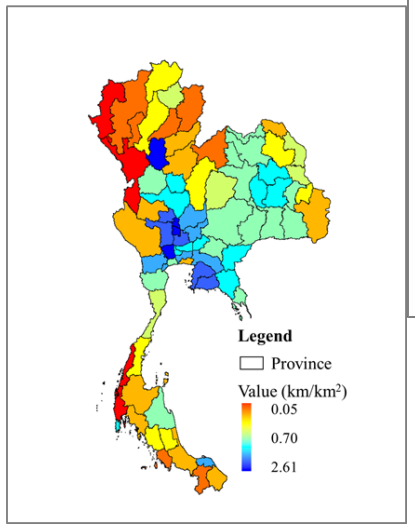
Potential Investment Density



Reservoir Capacity per Area

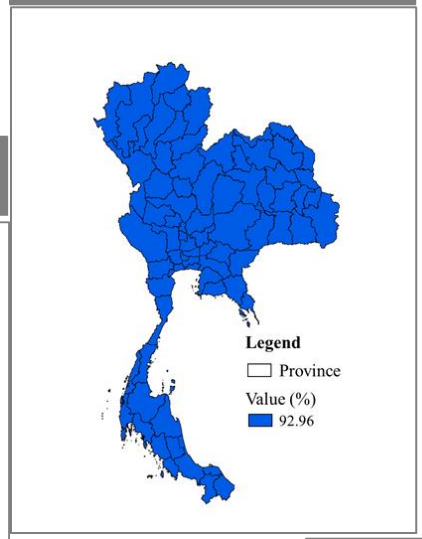


Infrastructure

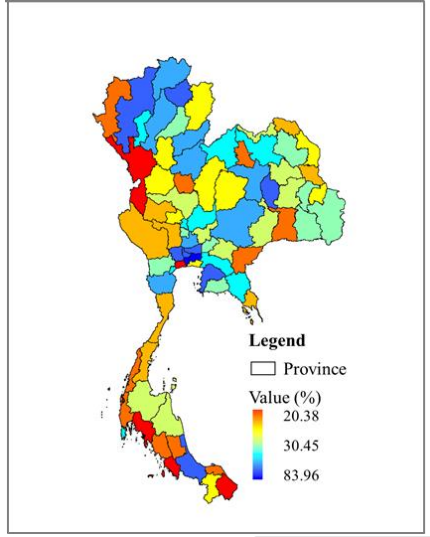


Soft Coping Capacity

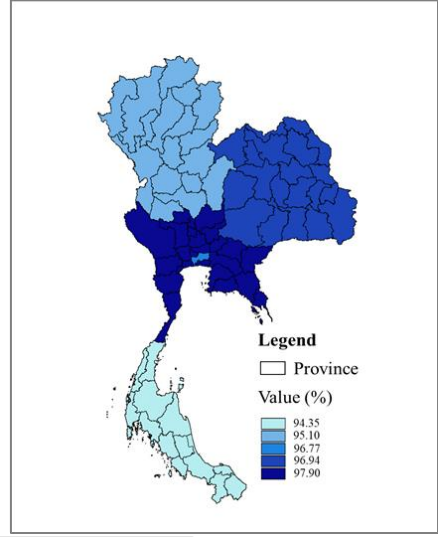
Literacy ratio



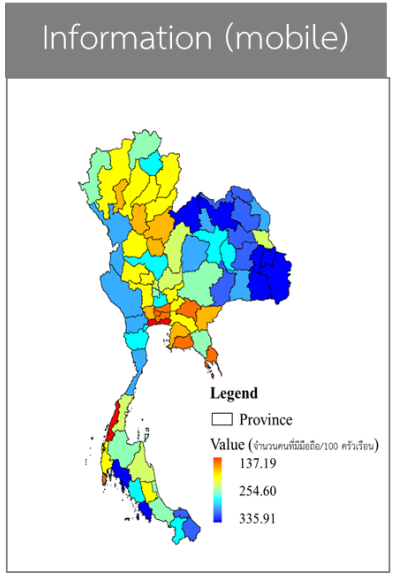
Education (enrolment ratio)



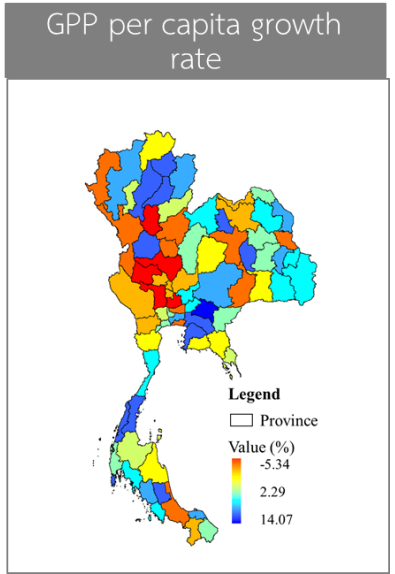
Information (TV)



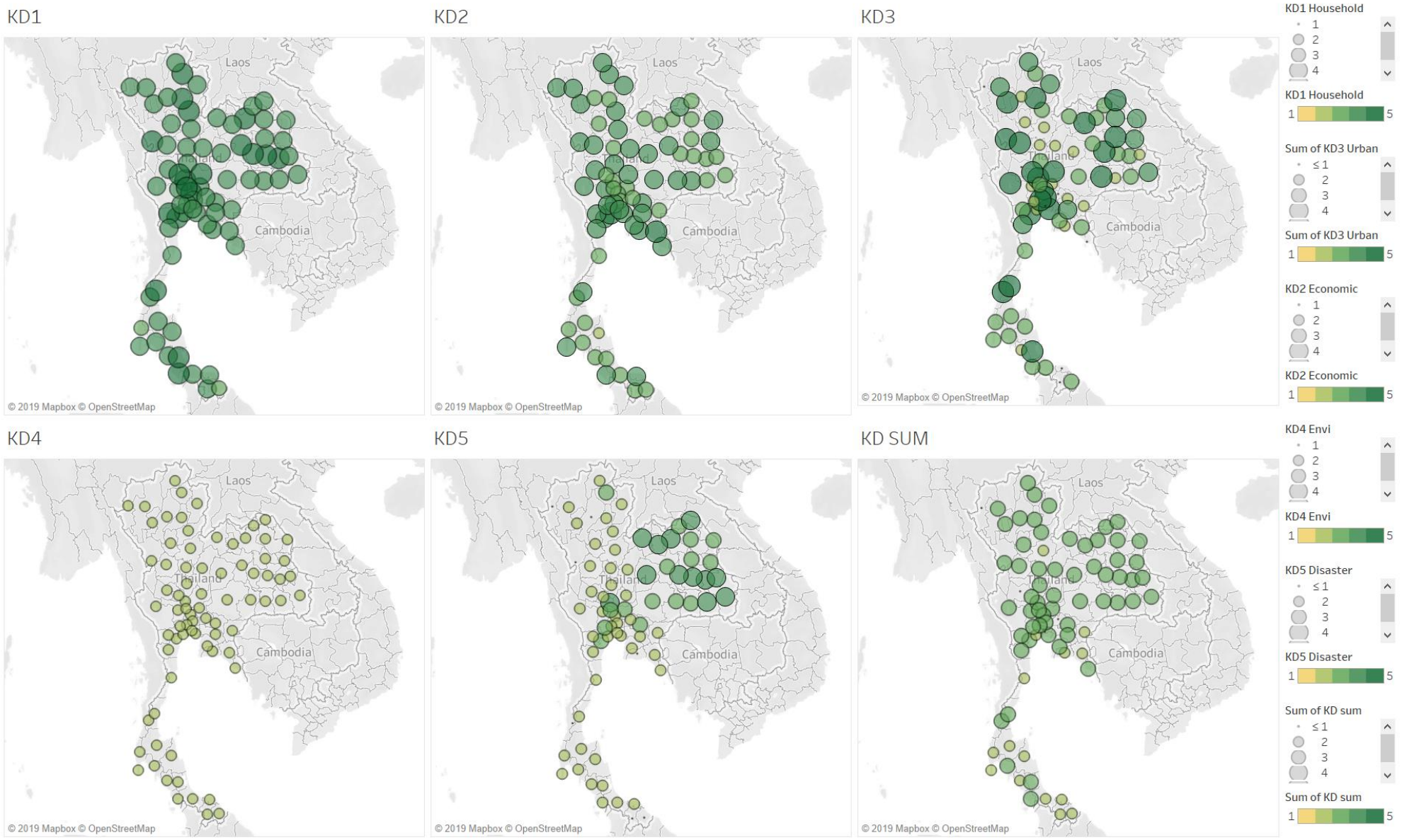
Information (mobile)



GPP per capita growth rate

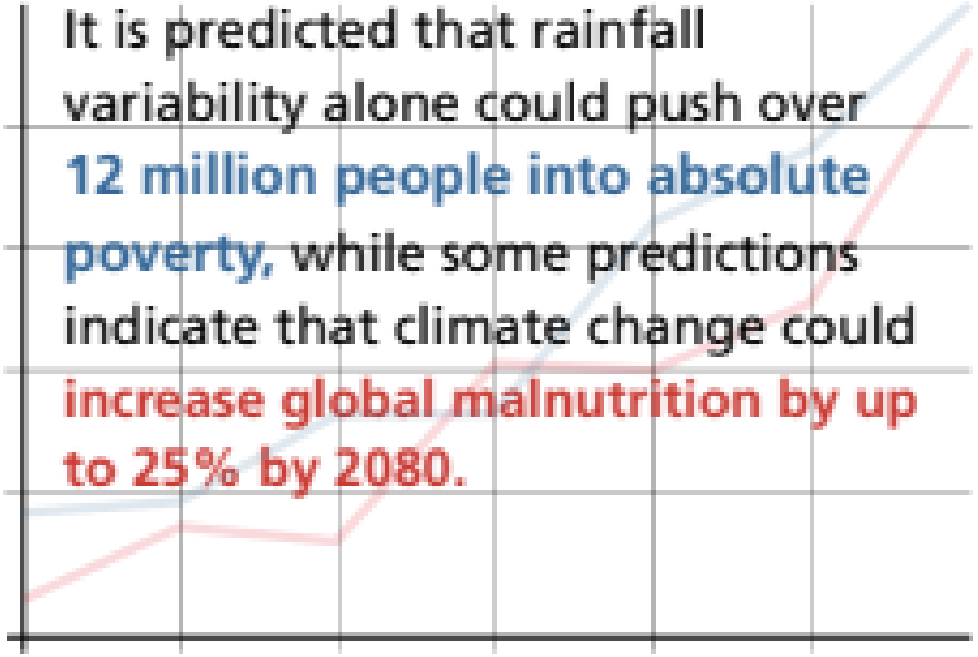


Adapting AWDO 2016 Framework for Provincial Water Security Assessment (research)



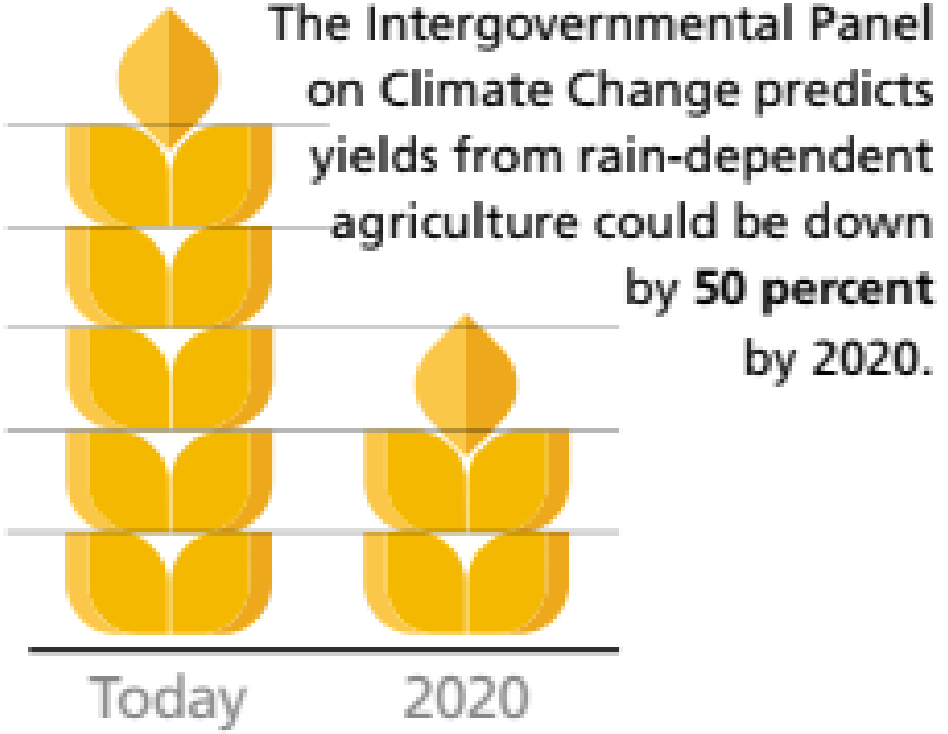
Climate Change and Water Security

Rainfall to affect poverty figures



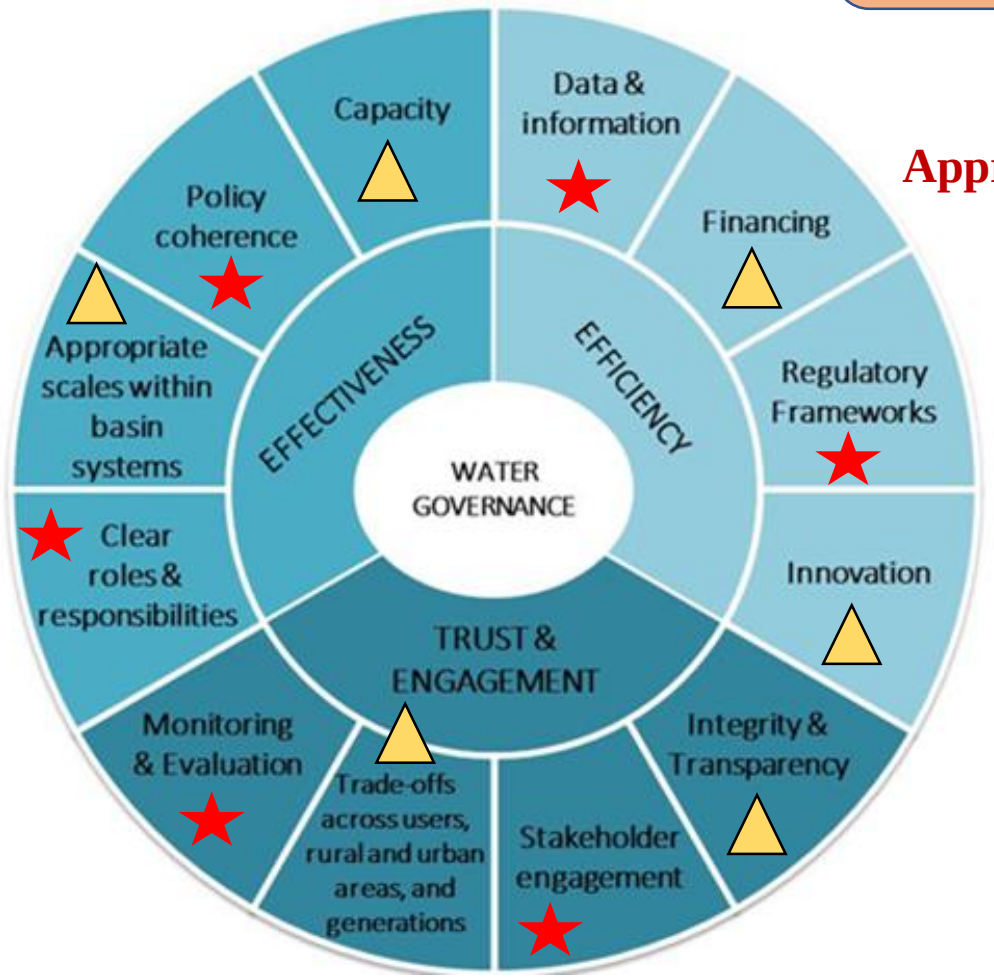
Source:United Nations Environment Programme (UNEP)

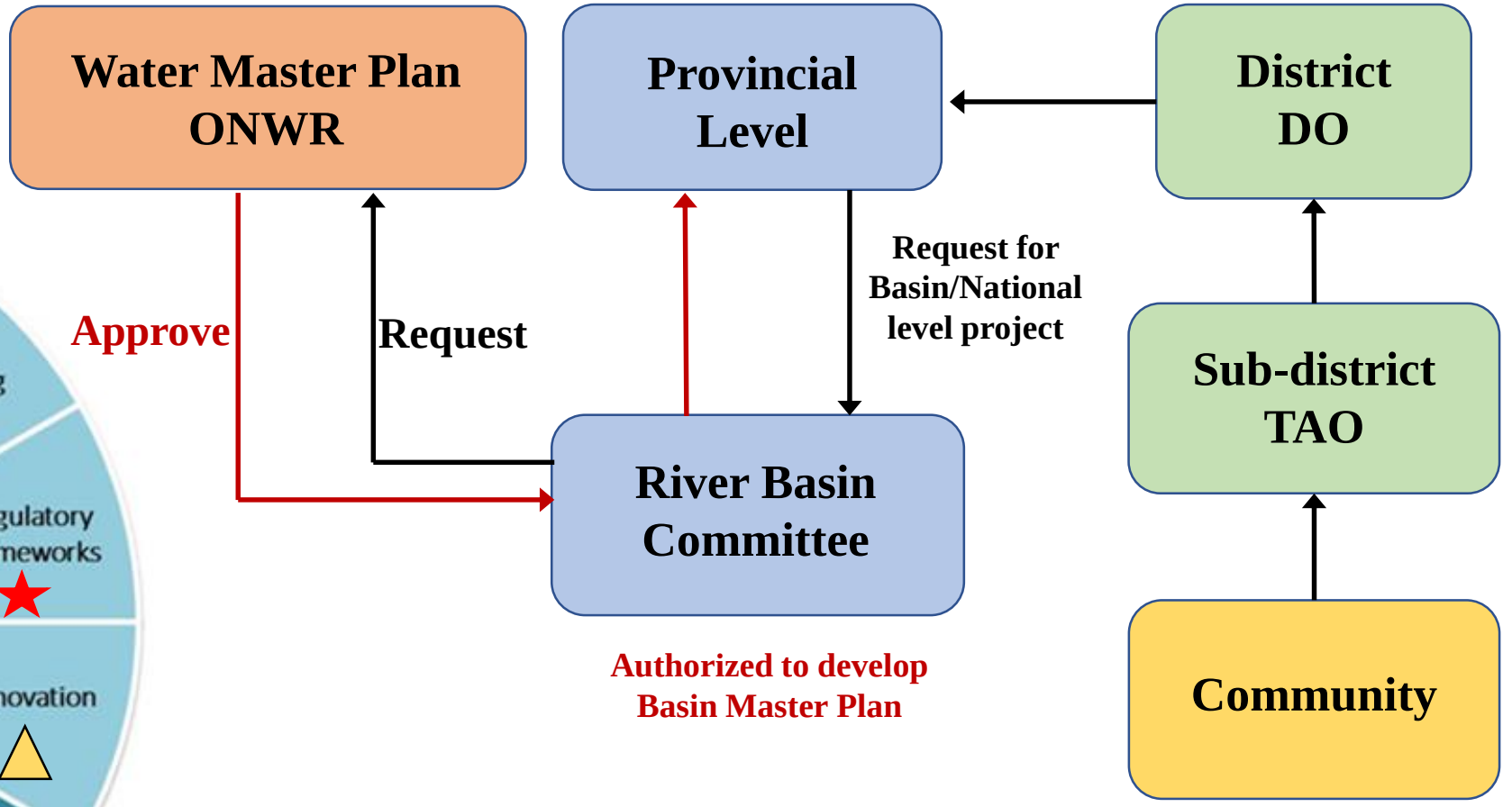
Daily water requirement



Source: United Nations Environment Programme (UNEP)

Water Governance





★ Expected to improve

△ To be defined at each level

Lessons Learned

Before Water Resources Law

- Each agencies had its **own way** of managing water, management, governance, and goals.
- There are some **good practice** cases at each level for water governance (e.g. community irrigation management in northern region, etc.)

After Water Resources Law

- The role, responsibilities, policy coherence, early warning system, regulatory framework, stakeholder participation, evaluation are to be **improved, standardized and more proactive**.
- Capacity building, appropriate scale, trade-offs, transparency, financing, and innovation are to be **defined and aligned** at each level within the time limit.

Acknowledgement & Next Steps

Water Security Workshop in Bangkok on 19 August 2019
ADB, OECD, IWC, Chulalongkorn University, Thai Water Partnership, CRI, and Representatives from Office of the National Water Resources (ONWR) and water-related government agencies
Supported by **Thailand Science Research and Innovation (TSRI)**

Policy evaluation by Office of the National Economic and Social Development (AWDO + Water Productivity + Water Governance)

Monitoring & Evaluation of National Water Resources Projects by Office of the National Water Resources

OECD: Water Governance in AWDO 2020

OECD: Water Finance in AWDO 2020

IWC, Australia: Environmental Water Security

Water security encapsulates complex and interconnected challenges and highlights water's centrality for achieving a larger sense of security, sustainability, development and human well-being.

Water security will require a wide range of capacities, using a multi-disciplinary approach to adequately address a similarly wide range of demands.

References

- Office of the National Economic and Social Development (NESDB), **National Strategy (2018-2037)**
- Office of the National Water Resources (ONWR), **Master Plan on Water Resources Management (2018-2037)**
- ADB (2016), **Asian Water Development Outlook 2016**
- OECD (2015), **OECD Principles on Water Governance**
- Koontanakulvong S. and C. Suthidhummajit (April, 2019), Technical report of **water productivity** under "Research Project on "Analysis of water security, water productivity and water-related disaster for water resources master plan", supported by Thailand Science Research and Innovation (TSRI)
- Ruangrassamee et al. (2019), **Research Project on "Analysis of water security, water productivity and water-related disaster for water resources master plan",** supported by Thailand Science Research and Innovation (TSRI)
- Suttinon P. (2019), Inception report on **monitoring & evaluation of national water master plan**, supported by Office of the National Water Resources

Thank you for your attention

Piyatida.H@chula.ac.th