

## Community based water resources management criteria towards SDGs

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### ABSTRACT

With social and economic development and more climate variability, water allocation to different water user groups needs more coordination. Integrated Water Resources Management (IWRM) approach has been widely adopted to achieve the coordinated development and management of water resources. The objective of this study is to investigate the existing capacity of water user groups by carrying out the focus group at 33 subdistricts to assess community based water resources management capacity, studying the relationship between the capacity assessment and the Water Management Index from National Statistical Office, and examining the linkage to SDG 6.5.1 in order to promote more community water management in the future. Based on the assessment of the existing capacity of community based water resources management of 33 subdistricts in 15 provinces and 5 regions in Thailand and Water Management Index, the results demonstrate indicative relationship between water security and water governance. The ten attributes to assess community capacity used in this study are conformed with criteria used in SDG 6.5.1 for participation. Promoting community capacity building with the ten attributes proposed in this study can help community-based water resources management to improve and reach higher level of SDG 6.5.1.

**Keywords**— IWRM; SDG 6.5.1; community-based water resources management; Water Management Index

### INTRODUCTION

Integrated water resources management, good water governance, cooperation, and water financial sustainability are keys for water allocation among different water user groups under social and economic development and greater climate variability. Integrated Water Resources Management (IWRM) is defined by Global Water Partnership (GWP) as “a process which promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment.” The IWRM principles had been developed based on the Dublin Principles and the key components of IWRM are enabling environment, institutions and participation, and management instruments (1). UN Water has encouraged IWRM implementation and defined Target 6.5 of SDG6 to “by 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate” and the indicator 6.5.1 is the assessment on “degree of integrated water resources management implementation.”

To enhance policy coherency of Thailand's water resources management, the Office of National Water Resources (ONWR) was established in 2017 to be the main organization that systematically regulate and manage the policies of integrated national water resources management and the National Water

Resources Act was approved in 2018. For institutions and participation component, the progresses have been towards strengthening community-based water resources management. Water User Association (WUA) has been established to aim for better water allocation coordination and management (<https://twuo.onwr.go.th/>). In terms of quantitative assessment of water security of Thailand, National Statistical Office (NSO) developed Water Management Index (WMI) that includes 8 dimensions and the database can be accessed from <http://wtc.nso.go.th/> WMI has been developed to evaluate status of water management at river basin, provincial, district, and subdistrict scales. WMI also includes participation assessment.

In this study, we aim to investigate the existing capacity of water user groups by carrying out the focus groups at 33 subdistricts to assess capacity of community based water resources management, studying the relationship between the capacity assessment and the Water Management Index from NSO, and examining the linkage to SDG 6.5.1 in order to promote more community water management in the future.

## 2 STUDY AREA

In this study, the research is carried out through network universities and node networks in 5 regions across Thailand. Each team identified target water user groups and communities based on the field survey. The study area of this study includes 33 subdistricts in 15 provinces and 5 regions as shown in Figure 1. The water user groups and communities in this study represent various water uses and conditions.

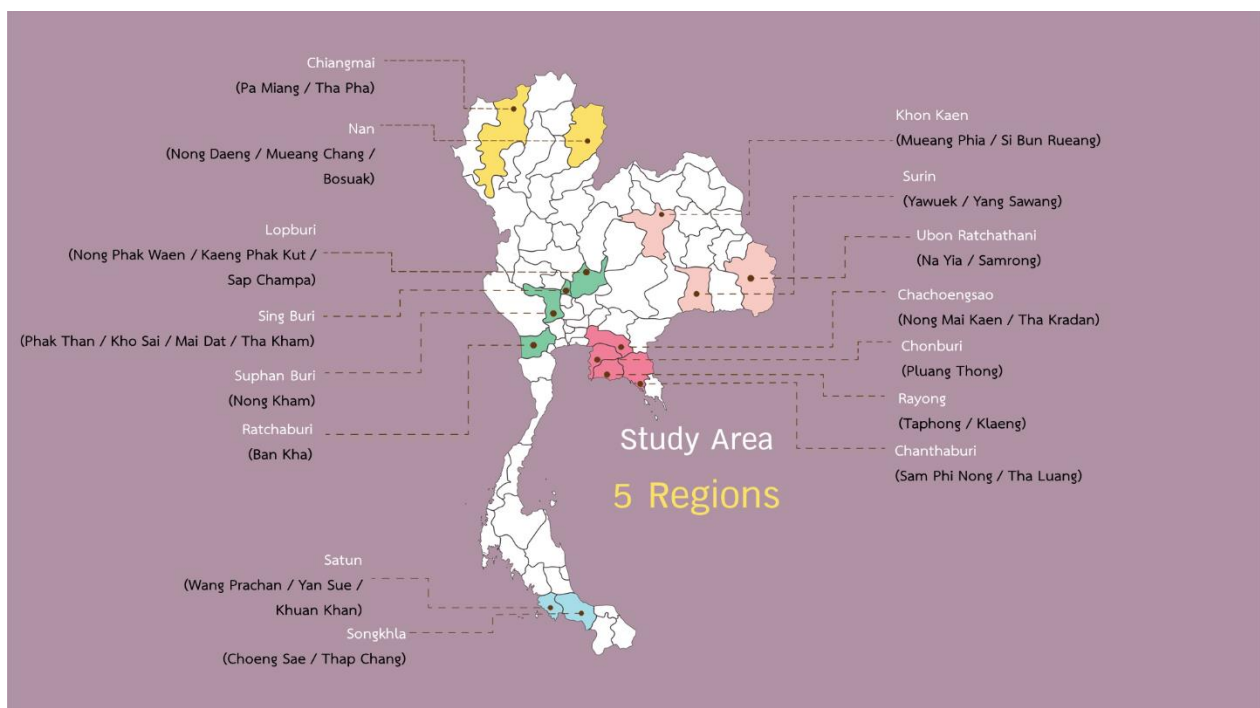


Fig. 1. Study area of 30 subdistricts in 15 provinces

## 3 METHODOLOGY

The focus groups of selected water user groups and communities of 33 subdistricts were organized by network universities and node networks in the 5 regions. The aim of this study is to assess existing capacity and objectives of each water user group and community by using questionnaire, focus group meetings, meetings via online platforms, and interviews during June – August 2021.

The good water management practices and necessary attributes at community level is derived from our previous work on the community-based action research carried out under the project “Water Use Efficiency Improvement in local level within Tor Tong Daeng Irrigation Project area” in Kamphaeng Phet as well as literature reviews (2,3). As a result, ten attributes of effective community-based water resources management are identified as follows:

1. Water user group with clear roles and responsibilities
2. Capable committee to manage community water resources
3. Community-based databases and information systems for water resources management
4. Platform for participatory planning
5. Eco-based water resources management plans
6. Approved measures for water resources management
7. Funds for water resources management
8. Monitoring and evaluation system
9. Collaborating mechanisms with other parties
10. Capacity development

These ten attributes are linked with degree of integrated water resources management implementation at community level. The focus groups in the 33 subdistricts were organized to gather information and supporting evidence for the assessment of community water resources management. This process is a preliminary assessment before our capacity building program is implemented. We classify the capacity level of community-based water resources management into three levels as follows:

Low capacity level: community has 1-4 attributes

Medium capacity level: community has 5-7 attributes

High capacity level: community has 8-10 attributes

In this study, the Water Management Index (WMI) from NSO was obtained for the 33 subdistricts. WMI includes 8 dimensions with 59 indicators and 92 variables. The data and scoring on the scale of 1-5 of each indicator are provided at river basin, regional, provincial, district, and subdistrict scales. The relationship between Water Management Index (WMI) (4) and our preliminary assessment is investigated in this study.

#### **4 RESULTS AND DISCUSSIONS**

The result based on the focus groups in the 33 subdistricts before implementing the training program to assess community capacity in water resources management is shown in Table 1. Out of 33 subdistricts, 8 subdistricts are assessed as medium capacity level and 25 subdistricts are assessed as low capacity level of community-based water resources management. There is no subdistrict with high capacity level.

The relationship between Water Management Index (WMI) (4) and our capacity assessment is shown in Figure 2. For the group of subdistricts with medium capacity level of community-based water resources management, their WMI is above 2.50 and less spreading when compared to the group of low capacity level. The average WMI of medium capacity level group is 3.2 with the standard deviation of 0.29 while the average WMI of low capacity level group is 2.8 with the standard deviation of 0.43. This could be indicative for causal relationship between water security and water governance.

TABLE 1 Assessment of community capacity for community-based water resources management before implementation of training program and Water Management Index

Province	Subdistrict (Tambon)	Assessment of community capacity (before training)			Water Management Index (WMI) (NSO, 2020)
		Low level 1-4 attributes	Medium level 5-7 attributes	High level 8-10 attributes	
Nan	Nong Daeng	✓			3.67
	Mueang Chang	✓			3.28
	Bosuak		✓		3.26
Chiangmai	Pa Miang	✓			3.42
	Tha Pha		✓		3.49
Ubon Ratchathani	Na Yia	✓			2.29
	Samrong	✓			2.90
Khon Kaen	Mueang Phia		✓		2.70
	Si Bun Rueang		✓		2.86
Surin	Yang Sawang	✓			2.67
	Yawuek	✓			2.86
Chachoengsao	Nong Mai Kaen	✓			2.93
	Tha Kradan	✓			3.09
Chanthaburi	Sam Phi Nong	✓			3.05
	Tha Luang	✓			3.57
Chonburi	Pluang Thong		✓		3.48
Rayong	Klaeng	✓			2.63
	Taphong	✓			3.32
Sing Buri	Phak Than	✓			2.44
	Mai Dat	✓			2.27
	Kho Sai	✓			2.33
	Tha Kham	✓			2.55
Lopburi	Kaeng Phak Kut	✓			2.59
	Tale Wang Wat	✓			2.46
	Sap Champa	✓			2.86
	Nong Phak Waen	✓			2.58
Suphan Buri	Nong Kham	✓			1.98
Ratchaburi	Ban Kha		✓		3.31
Satun	Wang Prachan		✓		3.41
	Yan Sue	✓			3.08
	Khuan Khan	✓			2.63
Songkhla	Choeng Sae		✓		3.08
	Thap Chang	✓			3.18
<b>15 provinces</b>	<b>33 subdistricts</b>	<b>25</b>	<b>8</b>	<b>0</b>	

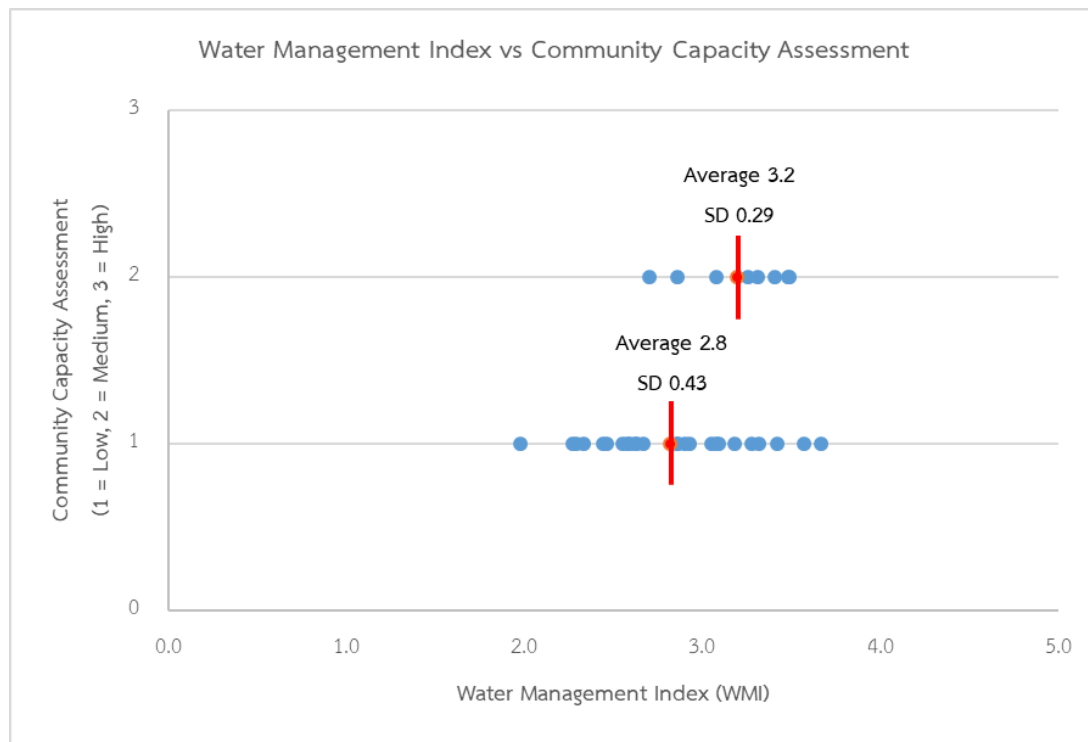


Fig. 2. Relationship between WMI and community assessment

In addition, the linkage between community-based water resources management capacity and SDG 6.5.1 is examined. Indicator 6.5.1 of SDG 6.5 tracks the degree of integrated water resources management (IWRM) implementation, by assessing the four key components of IWRM: enabling environment, institutions and participation, management instruments, and financing (<https://www.sdg6monitoring.org/indicator-651/>). The survey instrument is used for the assessment (5). For institutions and participation, the assessment focuses on the status of institutions for IWRM implementation. Relevant key components for roles of communities and water user association are developing IWRM capacity and public participation in water resources, policy, planning and management at the local level. An example of level of IWRM capacity is if long-term capacity development initiatives are being implemented, and geographic and stakeholder coverage is adequate, this will be considered medium-high. For high level, long-term capacity development initiatives are being implemented with highly effective outcomes, and geographic and stakeholder coverage is excellent. For public participation at local level, the evaluation moves from no information shared, information made available to public, communication, consultation, and collaboration (5).

Community-based water resources management capacity building will help strengthening public participation in water resources, policy, planning and management at local level. Capacity development of community is key for improving community-based water resources management, therefore, supporting network, data and information sharing, and financing with good governance are essential.

#### 4 SUMMARY

The assessment of existing community capacity for water resources management based on the ten attributes carried out in 33 subdistricts in 15 provinces across 5 regions of Thailand shows that 8 subdistricts are assessed as medium capacity level and 25 subdistricts are assessed as low capacity level. There is no subdistrict with high capacity level. The relationship between Water Management Index (WMI) from NSO and our assessment could be indicative for relationship between water security and water governance. The ten attributes used in this study are conformed with criteria used in 6.5.1

for developing IWRM capacity and public participation. Promoting community capacity building with the ten attributes proposed in this study can help community-based water resources management to improve and reach higher level of SDG 6.5.1. Further research will be carried out to provide a training program to the water user groups in 33 districts and assess their capacities.

#### **ACKNOWLEDGMENTS**

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