Water Security and Sustainability
Thailand's Water Security Situation in the context of world and ASEAN

Assoc. Prof. Dr. Sucharit Koontanakulvong[1]
[1]Faculty of Engineering, Chulalongkorn University, Thailand

Abstract

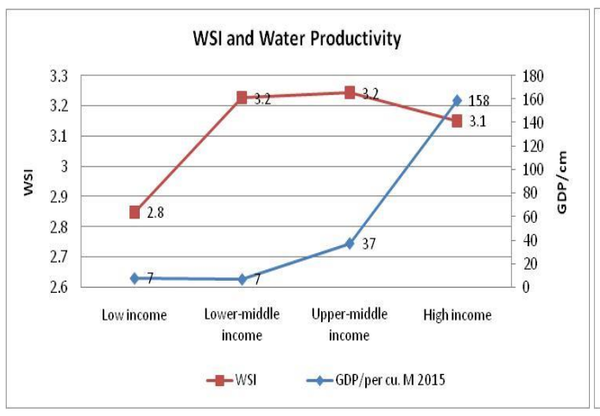
Worlds nowadays focus on SDG goals to be set as country benchmark for socio-econ-environmental development.The successful countries for sustainable water security depend on efficiency of integrated water management, water productivity and provision of water supply and sanitary services. Water security index was another issue that had been proposed to monitor the national socio-economical development which comprised of household, urban water, economic water (including irrigation water), river health and resilience. The study proposed the water security definition and assessed the water security status of Thailand by using water use status and correlated with gross domestic product per capita, water productivity, Government effectiveness (Governance), political stabilities in various countries of the world, Asia and ASEAN which helped to understand the competitiveness and the strength, weakness and potential of water resources development of Thailand compared with the rest of the world and ASEAN countries and their initiatives needed.

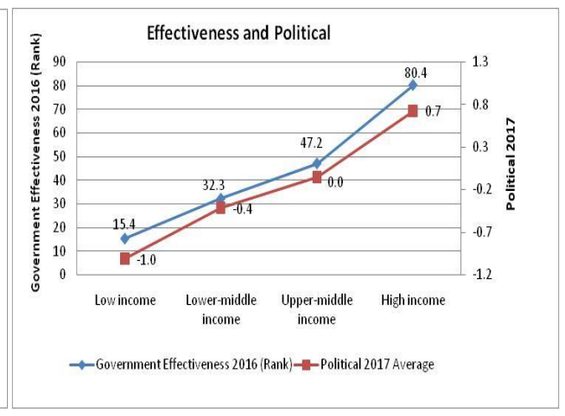
Definition and methodologies

This study determined the water security status from five dimensions, i.e., WS1: basic water (renewable, supply, hygiene), WS2; sufficient water (water supply, consumption, agricultural water), WS3:development water (irrigation area, industrial water use, water for energy, water for aquaculture), WS4:water disaster (loss from floods and drought), WS5:water for future (population growth, urban population growth, water footprint) (Sucharit et. al., 2014). The index status analysed were correlated with water use unit (cubic meter per capita), water productivity (US $ per cubic meter of water use), government effectiveness, political stabilities and grouped into four groups of country classified by income per capita of the country. Based on the available data from various sources of the world (World Bank, 2016; ADB, 2016), the index of each country was determined comparatively by weighting equally from each dimensions and ranked by marking equally (1-5 points) of each elements from the average and standard deviation values while the security status in ASIA is based on ADB study (ADB, 2016, 2019; Piyatida et.al., 2019).

Water security status in the world scale

From the analysis, the average water use unit, water productivity grows up with the GDP per capita growth though the agricultural water use in the high income group decreased due to the change of water use structure. In general, more water productivity induced better water security status. Water security index increased from the less income group to lower middle income group and became stable in the upper middle and high income group due to the loss of water disaster (which may reflect from the data availability). The water productivity, measured by the income per capita and per water use unit, was assessed and compared with the water security index obtained and it showed that more water productivity induced better water security statusin the upper middle and high income group due to the loss of water disaster. The distribution of water security status of each country (146 countries) in the world scale can be shown in the map based on the water security definition proposed in the study.



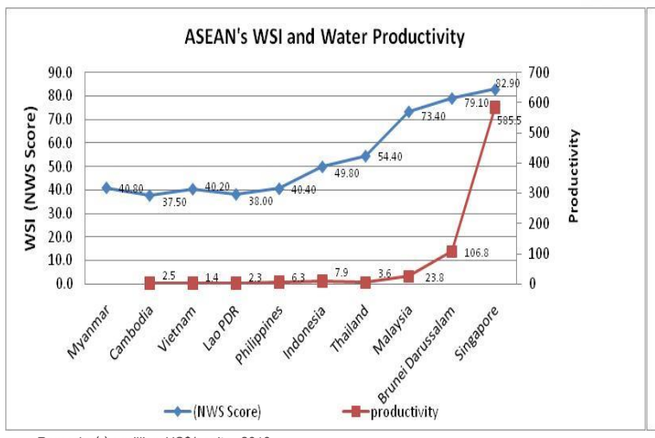


Acknowledgement

The authors would like to express sincere thanks to NRCT-TRF Spearhead Research Program on Water Resources Management for their research funding, thanks to RID-Thor Thong Daeng Irrigation Project, Kamphengphet Province, GISTDA for their assistances for field data provision, satellite images and to Chulalongkorn University for their working place and utility provision.

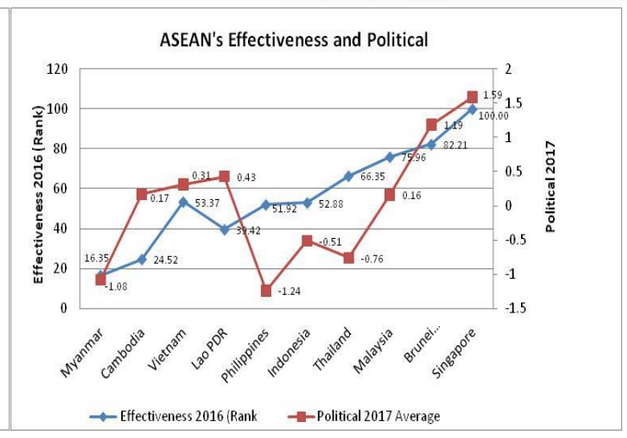
Thailand and ASEAN

The water security status of Thailand, compared with the world, Asia and ASEAN regions were investigated with the ranking in each dimension as shown in Table 1. Within ASEAN countries, the water use, water productivity(Suthidhummajitet.al., 2019) and water security status of each country VS country GDP per capita were assessed comparatively and it showed that Thailand has the highest water use unit, moderate lower water productivity and moderate in water security ranking.



Remark: ( ) : million US$/capita, 2010

WSI and Water Productivity VS GDP



ASEAN-Average Effectiveness and Political

Table 1 Water Security of Thailand compared with the rest of the world

Elements	World		Asia		ASEAN		Thailand
	average	ranking	average	ranking	average	ranking	
Gross domestic product : Population	14,260	88	9,546	14	11,117	4	5,980
Water productivity (GDP/cm)	81	132	49	20	82	6	4
Government Effectiveness	48.70	59	46.34	13	56.30	2	66.3
Political stability index	-0.05	118	0.14	32	0.03	8	-0.76
National Water Security Index by Economy (NWS Score) (full score: 25)	15.8	23	16.7	12	17	5	17.3

Remark: 1) Gross domestic product Population: World Bank (2016), 2) Water productivity (GDP/cm) : World Bank (2015), 3) Government Effectiveness : World Bank (2016), 4) Political stability index : World Bank (2017), 5) National Water Security Index by Economy: ADB 2016, * Sucharit 2014.

National Water Management Strategies

Thailand had set up long term National Strategic Plan and water resources management is an important issue out of 23 issues (NESDB, 2019). The concept of water security was used of the framework and target setup on water security, water productivity, water governance with counter initiatives in lined with SDGs, i.e.,

Group 1 to reduce loss via issues of flood and drought (SDG 13), urban water (SDG 11),

Group 2 to induce more value added and participation via issues of water productivity (SDG 9) and water governance (SDG 16),

Group 3 to upgrade quality of life via issues of environmental water (SDG 6), watersanitary (especially in the rural areas) (SDG 6).

Conclusions

This study showed the status of water security of Thailand compared with the rest of the world. Thailand has strengths on clean water and sanitation water accessibility and water for development due to the investment in the past. However, water use status in fresh water renewable, agricultural sector, i.e., low efficiency, high water footprint, low productivity, water resilient, urban water seemed to be a weakness compared with other countries. Water governance is comparatively in good handled. Based on the National Master Plan on water resources management, the urgent issues are to reduce loss, to enhance more value added and to improve quality of life to comply with SDG 6.

References

ADB (2016) ASIAN Water Development Outlook, ISBN 978-92-9257-543-4 (Print), 978-92-9257-544-1 (e-ISBN), Publication Stock No. RPT168317-2

ADB (2019) Asian Water Development Outlook 2020, Asia Pacific Water Forum, Report on 1st Coordination Workshop, 27 and 28 February 2019.

Piyatida H., et. al., Water security, Water Productivity, Water Resilience Assessment for Water Masterplan Preparation, Progress report, Feb 2019 (in Thai).

NESDB, Master Plan under National Strategic Plan, Water System Management, Report No. 19, 2019 (in Thai).

Sucharit Koontanakulvong, PiamchanDoungmanee and PiyatidaHoisungwan. "Thailand's Water Security Situation in the context of world and ASEAN." Hydrological Sciences and Water Security: Past, Present and Future (from Proceedings of the 11th Kovacs Colloquium, Paris, France, June 2014). IAHS Publ. 366, (2014): 2 pp. (IAHS Press doi:10.5194/piahs-366-117-2015)

Suthidhummajit S. and Koontanakulvong S.The study report of Water Balance Analysis, Water Accounting and Water Productivity, 2019.

Suthidhummajit S. and Koontanakulvong S., Evaluation of Water Productivity of Thailand and Improvement Measure Proposals, Proc. KWRA, May 2019.

World Bank, http://data.worldbank.org/indicator/NY.GDP.MKTP.CD, 2016

((Note The material is distributed in the session of Water Security in the UNESCO International Water Conference during 13 and 14 May 2019 at UNESCO Headquarters in Paris, France).