



The Development of Tourism Plan of the Upper Part of Northeastern Region in the Next Decade, Thailand

Noppadol Dharawanij^{1*}, Wongjun Pairoj²

^{1,2}College of Tourism and Hospitality Industry, Rangsit University, Pathum Thani, Thailand; 5290180@rsu.ac.th (N.D.).

Abstract. The northeastern region of Thailand, comprising five provinces, is home to key tourist attractions. Over the next decade, both the local population and the number of Thai and foreign visitors are expected to increase. This paper investigates the current state of water supply and its impact on the region's communities and tourism sector. It examines the availability of rivers, canals, and other water resources that support both local consumers and tourism, while also predicting future trends in water supply and demand. Additionally, it explores the potential effects of natural water-related issues, such as flooding and drought, on the area over the next decade. The study utilized interviews with 25 stakeholders from 12 groups and focus groups of 359 government organizations and 370 private organizations and local residents' discussions. Data analysis was used to develop a strategic water management plan for the coming decade. The findings show that, in the past decade, water supply has been sufficient for both local communities and the tourism industry, with flooding impacts occurring only in Buengkan Province. No significant water supply issues have been identified. However, with expected population and tourist growth in the next decade, water supply itself is unlikely to become a problem. Instead, authorities should focus on flood prevention and management. Moreover, the promotion of cultural, creative, and agro-tourism is recommended to further boost tourism in the region.

Keywords: Creative and agro-tourism, Develop the tourism, Impact of water, Promote the tourism, The Effects of water on tourism, Water supply.

1. INTRODUCTION

The upper region of northeastern Thailand is geographically divided from the lower part by the Phupan mountain range. This area consists of 11 provinces; however, this study focuses specifically on five provinces: Buengkan, Loei, Nongbualamphu, Nongkhai, and Udonthani (Tourism Authority of Thailand, 2009). The region features the upper plateau and the Sakhonnakorn basin, with Loei Mountain, which rises to an average elevation of 1,000 meters above sea level, being the source of two major rivers: the Loei and Songkram rivers. These rivers eventually flow into the Mun and Panieng rivers, which merge into the Khong River. Additionally, Phu Kao, with an average elevation of 600 meters above sea level, is the origin of the Huay Luang River, which flows into the Khong River, while the Pong and Mao rivers feed into the Chee River. The Phu Pan mountain range, a limestone mountain located east of Nong Lahan in Udonthani province, further shapes the region's topography (Tourism Authority of Thailand, 2022).

Table 1: Five provinces in the upper part of northeastern Thailand and tourist attractions located in the provinces.

Provinces	Natural Attractions	Tourist	Cultural Attractions	Tourist	Man-made Attractions	Tourist	Customs and Festivals
Buangkan (TAT, 2009)	Caves: Naga Cave Waterfalls: Ched Si, Phu Thamphra Lakes: Bung Khong Long, Nong Kut Ting Mountains: Phu tok Noi, Phu Singh		Temples: Photaram temple, Chetiya Khiri Chaomae Shrine	Songnang	Thai-Laos Flea Market		Rocket Festival, Songkran, Candles parade, Boat racing, Light boat parade
Loei (TAT, 2009)	Kaeng Kutku, Kaeng Ton Phuluang Wild Animal Reserve View Points: Decho, etc. Caves: Pha Pung, Pha Ya etc. Waterfalls: Khun Pong, Chang Tok etc. National Parks: Phu Kadung, Phu Rua		Temples: Si Song Rak, Satcha, Museums: Local Museum Buddha Image Lord Buddha Foot Print City Pillar Shrine Archaeological Sites: Mahoran Cave, Laitang Cave		The Little House in Big Forest Project, Loei Highland Research and Development Sirindhorn Art Center 60 Years of Queen Sirikit Public Park Phu Rua Grape garden Thai-Laos Friendship Bridge Reservoir		Red Cross Fair Si Song Rak Praying Fair Phi Ta Khon Winter Flowers Fair
Nongkhai (TAT, 2009)	Phu Wua Wild Animals Reserve View Points: Tam Prai etc. Waterfalls: Jet Si, Tarn Tong etc. River Beaches: Chom Manee, Sita etc.		Phra Dhat Bang Puan, Phra Dhat Klang Nam Nongkhai Museum Temples: Tam Sri Mongkol, Phochai etc. Buddha images Monument		Tha Sadet Market Aquarium Symbol Shrine Wicker ware Village Freshwater Fisherman Village Public Parks		Boat Racing The Celebration of the Victory over the Hor Rebellion Red Cross Fair Rocket Festival Songkran Festival
Nongbualamphu (TAT, 2009)	Hor Sawan View Point Caves: Pha Cho, Pha Wieng etc. Waterfalls Tao To Forest Park Phu Kao-Phu Pankam National Park		Naresuan, the Great Monument Temples: Tam Kong Pen etc. City Pillar Shrine Archaeological Sites		150 Million years Stone Shell Museum Reservoirs		Visit Hoi Hin and Longan Fair Luang Pu Kao Praying Fair
Udonthani (TAT, 2009)	Kum Chanod View Points Waterfalls Forest Park Na Yung-Nam National Park	Som	Phra Dhat Don Kaew Lord Buddha Foot Print Monument Ban Chiang Museum Temples		Ban Chiang Thai Puan Udon Sunshine Orchid Farm Ban Men Handicraft Center Na Kha Village		Food Street Fair Rocket Festival Songkran Festival Tung Sri Muang Annual Fair Bang Chiang World Heritage Fair

Source: Tourism Authority of Thailand.

This region is home to several significant rivers, canals, and water resources. The Khong River, which forms the border between Nongkhai and Mukdahan provinces, is particularly notable for its vast width (700–1,000 meters) and depth (15–25 meters). Other important water bodies in the area include the Loei River, Songkram River, Kam Stream, Huay Bangsai, Huay Mook, and Huay Bang-E, along with various ponds such as Nong Han (8 kilometers wide and 13 kilometers long), Nong Pansak (5 kilometers wide and 10 kilometers long), and Nong Lahan (3 kilometers wide and 10 kilometers long) (Tourism Authority of Thailand, 2022). The region experiences an average annual rainfall of approximately 1,474 millimeters, with the wettest months occurring between May and September, averaging over 200 millimeters of rainfall. In contrast, the driest season occurs in December, with rainfall dropping to about 30% of the annual average. The area also boasts a diverse range of tourist attractions that draw both domestic and international visitors. These tourists contribute significantly to the local economy, generating increased revenue for the region (Tourism Authority of Thailand, 2020).

2. OBJECTIVES

- 1) To investigate the current state of water supply and its impact on the region's communities and tourism sector
- 2) To examine the availability of rivers, canals, and other water resources that support both local consumers and tourism and predict future trends in water supply and demand
- 3) To develop tourism in the areas for the future

The conceptual framework for this study is based on the integrated relationship between water supply, community well-being, and tourism development. Water, as a fundamental resource, plays a crucial role in

sustaining human populations, supporting economic activities, and fostering sustainable development. Water supply systems, including rivers, canals, and other water sources, are vital not only for meeting the needs of local residents but also for attracting and maintaining tourism activities (UN-Water, 2018).

In this framework, the water supply system is examined in the context of two main areas: 1) its role in the daily needs of local communities, and 2) its contribution to the tourism sector. The availability, accessibility, and quality of water directly affect community health, agricultural activities, and overall socio-economic development. Simultaneously, water is a key resource for tourism activities such as leisure, hospitality, and recreational industries that rely on pristine lakes, rivers, and beaches to attract visitors (Gössling, 2015).

The first objective of the study seeks to investigate the current state of water supply and its impact on the communities and tourism sector. In regions facing water scarcity or inefficient water management, both local communities and tourism-dependent economies are at risk of experiencing significant challenges. Water shortages can lead to public health issues, reduced agricultural output, and diminished tourist satisfaction, affecting overall socio-economic well-being. (D'Este et al., 2019)

The second objective, examining the availability of water sources, acknowledges that rivers, canals, and other water bodies serve as critical resources for local consumption and tourism activities. Water bodies are often integral to the tourism experience, offering a range of recreational and aesthetic benefits (Gössling, 2015). At the same time, the sustainability of these resources is threatened by overuse, pollution, and environmental changes that may degrade water quality or diminish the quantity of water available (Parker, 2019).

The final objective predicts future trends in water supply and demand, recognizing that climate change, population growth, and urbanization are likely to significantly influence water availability in the coming decades (Vörösmarty et al., 2010). Anticipating these trends is essential for developing adaptive management strategies that ensure a sustainable water supply for both communities and the tourism sector. This objective explores potential models of water demand management, conservation efforts, and technological innovations that can help balance the competing needs of different sectors.

By addressing these interconnected aspects of water supply, this study aims to provide a comprehensive understanding of the factors influencing water resources and their impact on both local communities and the tourism sector. This framework underscores the need for integrated, sustainable management practices that can protect water resources and support long-term socio-economic and environmental stability.

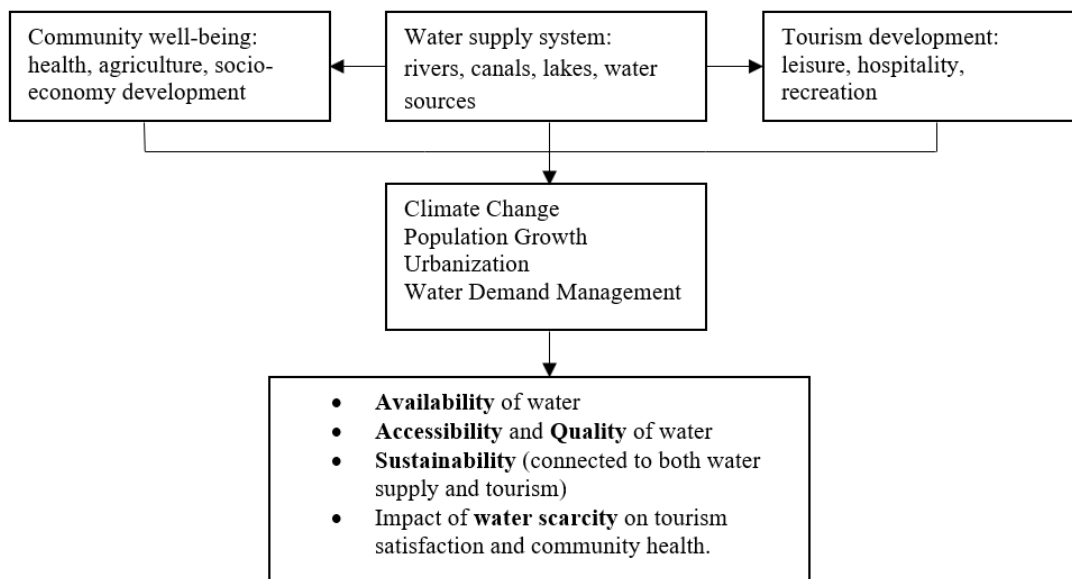


Figure 1:

3. MATERIALS AND METHODS

This study employed a qualitative research approach, utilizing interviews as the primary tool for data collection. The sample consisted of 12 key informant groups drawn from two main categories: 1) government organizations and 2) private organizations and local communities. The selection of key informants was conducted through purposive sampling. The 12 key informants included: 1) local residents, 2) government representatives, 3) academics and academic institutions with an interest in the region, 4) worker representatives who might be positively or negatively affected by water-related issues, 5) community leaders or influencers, 6) local politicians, 7) non-governmental organization (NGO) agents and social volunteers affiliated with the Office of National Water Resources (ONWR), 8) non-profit organizations (NPOs) in the region, 9) private sector representatives and entrepreneurs, 10) individuals involved in planning and budgeting, 11) owners of plans related to water and tourism management, and 12) senior officials from government offices or authorized decision-makers (NESDC, 2020).

Secondary data were also gathered from various sources, including textbooks, websites, and statistical reports. This secondary data was classified and organized for further analysis.

In addition to interviews, 25 stakeholders from the two main groups participated in two focus group discussions. The first group, representing government organizations, met in the provinces of Loei, Nongkhai, and Udonthani, while the second group, consisting of private organizations and local people, gathered in Buengkan, Loei, and Udonthani. The aim of these discussions was to gather diverse perspectives and opinions on water supply issues, conservation, and tourism sustainability.

Finally, the data obtained from both the interviews and focus group discussions were analyzed, synthesized, and incorporated into a strategic plan designed to address the challenges of water supply and the preservation of natural water resources. The plan also aimed to support the sustainable development of local communities and tourism businesses in the region.

4. RESULTS AND DISCUSSION

The study area consists of five provinces, which together encompass 57 districts, 419 sub-districts, 4,785 villages, 5 Provincial Administration Organizations, 1 Metropolitan Municipality, 6 Provincial Municipalities, 90 Sub-district Municipalities, and 396 Sub-district Municipality Organizations. The total population across these provinces is 3,584,660, with Udonthani having the highest population at 1,544,789. The average population density for the area is 98.10 persons per square kilometer (Bureau of Registration Administration [BORA], 2021).

Table 2: Populations in each province of upper part of northeastern region (2019).

Provinces	Populations	Households	Area (km. ²)	Population density (km. ²)
Total	3,584,660	1,049,473	34,346.28	98.10
Buengkan	403,542	103,159	4,305	97.74
Loei	624,066	166,243	11,424.612	54.34
Nongkhai	509,395	240,354	3,027.280	168.27
Nongbualamphu	502,868	124,849	3,859.086	129.80
Udonthani	1,544,789	414,868	11,730.302	131.19

Source: The Bureau of Registration Administration

Tourist arrivals and revenue steadily increased between 2014 and 2018 across all five provinces, as shown in Tables 3 - 7. These trends indicate the growing importance of tourism in the local economy, with both domestic and international visitors contributing significantly to the regional income. For example, Buengkan Province saw a steady increase in visitors, with Thai tourists growing from 530,921 in 2014 to 599,471 in 2018, and foreign tourists also increasing from 6,206 to 6,723 during the same period (Department of Tourism, 2020).

Table 3: Number of excursionists, tourists and visitors and revenue of Buengkan Province from 2014–2018.

Province	Excursionists, tourists, and visitors/revenue	Statistic number of tourists and revenues 2014 - 2018				
		2014	2015	2016	2017	2018
Buengkan	No. of Thai visitors	530,921	560,393	575,123	596,216	599,471
	No. of foreign visitors	6,206	6,360	6,541	6,756	6,723
	No. Thai tourists	314,527	331,270	335,505	347,340	348,345
	No. of foreign tourists	2,797	2,858	2,864	2,945	2,949
	No. of Thai excursionists	216,394	229,123	239,618	248,876	251,126
	No. of foreign excursionists	3,409	3,502	3,677	3,811	3,774
	Revenue (million Baht) Thai	828.18	906.03	964.40	1,041.11	1,057.09
	Revenue (million Baht) foreign	10.77	11.39	12.21	13.20	13.27

Table 4: Number of excursionists, tourists and visitors and revenue of Loei Province from 2014 - 2018

Province	Excursionists, tourists, and visitors/revenue	Statistic number of tourists and revenues 2014 - 2018				
		2014	2015	2016	2017	2018
Loei	No. of Thai visitors	1,548,723	1,897,358	1,993,768	2,092,365	2,192,198
	No. of foreign visitors	33,228	35,764	37,354	39,160	40,932
	No. Thai tourists	860,108	1,066,972	1,123,644	1,188,934	1,250,676
	No. of foreign tourists	19,562	20,976	21,802	22,660	23,698
	No. of Thai excursionists	688,615	830,386	870,124	903,431	941,522
	No. of foreign excursionists	13,666	14,788	15,552	16,500	17,234
	Revenue (million Baht) Thai	2,591.08	3,251.09	3,606.95	4,036.69	4,480.75
	Revenue (million Baht) foreign	84.39	96.05	104.73	115.90	129.39

Table 5: Number of excursionists, tourists and visitors and revenue of Nongbualamphu Province from 2014-2018.

Province	Excursionists, tourists, and visitors/revenue	Statistic number of tourists and revenues 2014 - 2018				
		2014	2015	2016	2017	2018
Nongbualamphu	No. of Thai excursionists	164,791	171,541	175,436	188,097	194,467
	No. of foreign excursionists	999	1,119	1,134	1,308	1,346
	No. Thai tourists	162,858	170,938	172,129	186,172	189,355
	No. of foreign tourists	395	444	437	489	503
	No. of Thai visitors	327,649	342,479	347,565	374,269	383,510
	No. of foreign visitors	1,394	1,563	1,571	1,797	1,849
	Revenue (million Baht) Thai	311.73	334.89	348.55	393.26	416.04
	Revenue (million Baht) foreign	1.52	1.76	1.80	2.11	2.25

Table 6: Number of excursionists, tourists and visitors and revenue of Nongkhai Province from 2014 - 2018.

Province	Excursionists, tourists, and visitors/revenue	Statistic number of tourists and revenues 2014 - 2018				
		2014	2015	2016	2017	2018
Nongkhai	No. of Thai excursionists	733,559	781,028	815,749	851,054	883,366
	No. of foreign excursionists	470,315	494,842	511,586	540,129	505,343
	No. Thai tourists	1,107,958	1,190,967	1,229,558	1,221,717	1,259,517
	No. of foreign tourists	48,569	50,508	51,607	51,392	52,965
	No. of Thai visitors	1,841,582	1,971,995	2,045,307	2,072,771	2,142,883
	No. of foreign visitors	526,981	545,350	563,193	591,521	618,308
	Revenue (million Baht) Thai	3,549.56	3,847.62	4,120.92	4,381.48	4,792.50
	Revenue (million Baht) foreign	627.24	660.07	704.66	771.36	846.11

Table 7: Number of excursionists, tourists and visitors and revenue of Udonthani Province from 2014 - 2018.

Provinces	Excursionists, tourists, and visitors/revenue	Statistic number of tourists and revenues 2014 - 2018				
		2014	2015	2016	2017	2018
Udonthani	No. of Thai excursionists	885,915	941,478	969,284	1,038,822	1,089,206
	No. of foreign excursionists	62,233	63,366	64,795	70,452	72,187
	No. Thai tourists	2,050,234	2,163,506	2,192,374	2,386,673	2,471,554
	No. of foreign tourists	75,505	77,158	77,948	85,340	87,510
	No. of Thai visitors	2,936,149	3,104,984	3,161,658	3,425,495	3,560,760
	No. of foreign visitors	137,738	140,524	142,743	155,801	159,697
	Revenue (million Baht) Thai	6,986.10	7,594.76	8,047.61	9,306.15	10,205.18
	Revenue (million Baht) foreign	467.27	489.94	510.80	586.36	636.06

Tables 3–7 present the number of tourists and revenue for each of the five provinces from 2014 to 2018. Notably, Udonthani had the highest tourist numbers and revenue, while Nongbualamphu had the lowest. Despite the impact of the COVID-19 pandemic, which caused a dramatic decline in tourist numbers and revenue in 2019, it is expected that tourism will gradually recover. The pandemic led to significant decreases in both domestic and foreign tourists, with reductions ranging from 4.17% for Thai tourists in Buengkan to 91.00% for foreign tourists (Department of Tourism, 2020). However, as the effects of COVID-19 subside, tourism is anticipated to increase again, supported by the development of specific tourism plans for each province. For example, Buengkan plans to promote the Khong River Civilization Path, while Loei aims to enhance its reputation as a center for ecological tourism.

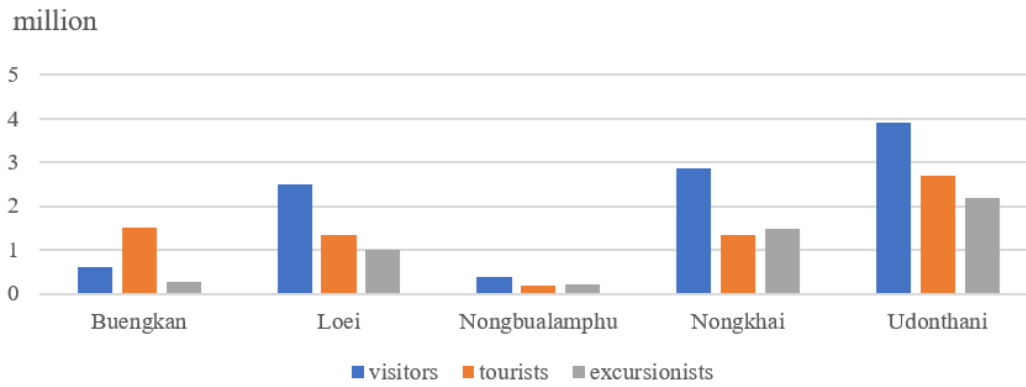


Figure 2: The prediction of numbers of Thai and foreign excursionist, tourists, and visitors in the next decade

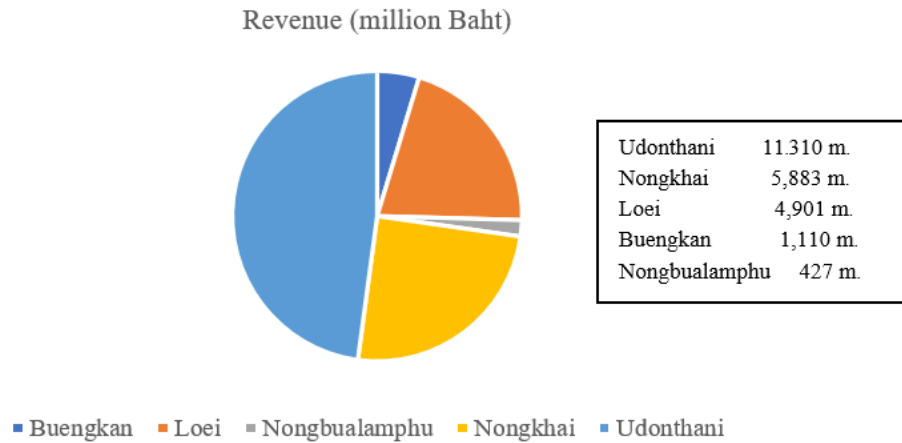


Figure 3: The prediction of revenues from tourism in the next decade.

However, the study highlights two key factors that could impact tourism: flooding and drought. Recent storms, such as Doksuri, Talas, and Sonca, caused significant flooding in 2017 and 2018, which affected both Thailand and neighboring Laos (Thailand Water Situation, 2018). Additionally, drought conditions in 2016 and 2019, exacerbated by the El Niño phenomenon, led to reduced water availability, particularly for agriculture (ONWR, 2020). While these events impacted local communities, their effect on tourism was minimal. Moving forward, proactive strategies will be required to manage these risks and ensure the long-term sustainability of tourism in the region.

In focus group discussions with stakeholders, several key points emerged. First, government agencies were encouraged to develop a strategic water usage plan for the next decade. This plan should focus on water conservation, efficient management of water resources, and the protection of local ecosystems. Additionally, these agencies should strengthen water-user organizations and support the agricultural sector by ensuring sufficient water supply for both consumption and farming. Second, private organizations and local communities were advised to collaborate with the government to promote the region's cultural heritage, alongside enhancing agro-tourism and religious tourism. Stakeholders were categorized into two main groups: government organizations and private organizations/local communities, with twelve key informants, including local residents, government representatives, academics, and tourism sector stakeholders (National Economic and Social Development Council [NESDC], 2020).

The data collected from government organizations and private organizations and local people for the focus group shown in Table 8.

Table 8: The focus group of government organizations and private organizations and local people result

No.	Date/Time	Place	Attendants	Results
1	September 27-October 08, 2021 08.30-16.00	Chaiyapruk Room, Loei Palace Hotel, Loei Monthathip Hall and Exhibition Center, Udonthani Grand Benchawan Room, Nongkhai Tha Villa Hotel, Nongkhai	359	- Supply and allocate water resource fairly and effectively - Protect and improve ecological service linked to water resource - Support the adaptation to the problems of water resource and the climate change - Strengthen and support the river basin administration and management
2	November 22-26, 2021 08.30-16.00	Sirintara 2 Room, The One Hotel, Buengkan Pasakorn Room, Monthathip Convention and Exhibition Center, Udonthani Chaiyapruk Room, Loei Palace Hotel, Loei	370	- Create value of culture and customs related to water such as travel in rivers or canals, support conservative tourism, cultural creative tourism etc. - Conserve and preserve water resources - Continue and promote culture and customs in the area

The study also examined water supply and its relationship with tourism. As of 2019, there were 981,843 households across the five provinces, with 87.82% of households having access to electricity. The water production and consumption data show that all provinces have sufficient water to meet current demands. For instance, Buengkan produces 200,349 million cubic meters of water annually, with usage at 197,167 million cubic meters, serving 7,109 households. Similar trends were observed in other provinces, such as Loei, Nongkhai, and Udonthani, where water production exceeds consumption, indicating no immediate risk to water supply for both residents and tourism (Office of National Water Resources [ONWR], 2019).

In the coming decade, the population and tourist numbers are expected to grow, and the water supply will remain adequate to meet the demands. The results of this study suggest that, at present, the region has the infrastructure and resources to support tourism and local communities. Specifically, the area hosts about 3 million tourists annually, generating approximately 6,000 million Baht in revenue. There are 23 large, standardized hotels, over 120 tour operators, and diverse transportation options available to tourists, further enhancing the region's appeal (Department of Tourism, 2020). As tourism numbers and revenues rise, water resources will continue to meet the demands of both residents and tourists without issue.

5. CONCLUSION

The findings from the interviews with stakeholders and the focus group discussions have provided valuable insights into the water supply situation and its implications for tourism in the region. Based on the data collected, the following conclusions can be drawn:

5.1. Water Supply and Tourism Impact Over the Last Decade and Present Situation

Over the past decade, the region has had a sufficient water supply to support local needs and tourism activities. However, there was an instance of flooding that had a negative impact on both the local area and tourism. Despite this, the overall water availability has been adequate to meet the region's demands.

5.2. Availability of Water Resources

The region is well-endowed with natural water resources, including rivers, canals, and reservoirs, which have been sufficient for sustaining both the local population and tourism activities. These resources are expected to continue supporting the area's needs over the next decade, ensuring a reliable water supply for various sectors, including tourism.

5.3. Predictions for Tourism Growth and Water Impact

The forecast for the next decade indicates a gradual increase in the number of excursionists, tourists, and visitors, alongside rising tourism revenues. While the growth of tourism is expected to be substantial, the supply of water will remain sufficient to meet these demands. However, potential challenges from flooding during the monsoon season could disrupt tourism activities temporarily.

5.4 Government Role in Water Resource Management and Disaster Prevention

It is crucial for the government to develop and implement a comprehensive master or strategic plan to preserve water resources. This plan should also include measures to protect the region from potential natural disasters, such as floods and landslides, ensuring that the local infrastructure and tourism activities are resilient in the face of these threats.

5.5. Promotion of Cultural and Water-Related Tourism

Local private organizations and residents should work in collaboration with the government to promote the cultural values and customs tied to water. This could include initiatives such as river or canal tours, conservation-focused tourism, cultural creative tourism, and agro-tourism. Emphasizing these aspects will enhance the region's tourism offerings while preserving its cultural heritage.

5.6. Preservation of Water Resources and Promotion of Sustainable Tourism

Both private organizations and local communities need to prioritize the preservation of water resources. At the same time, they should continue to promote cultural and agro-tourism, which can help sustain local economies while fostering a greater appreciation for environmental conservation.

6. RECOMMENDATIONS FOR FUTURE RESEARCH

1. A nationwide study on water resource management should be conducted, with provinces grouped according to their water availability, to ensure sustainable water reserves for the future.

2. Long-term strategies for the sustainable preservation and conservation of water resources need to be developed to support both local needs and tourism activities.

3. A strategic plan should be established to improve disaster prevention measures, particularly concerning water-related events such as flooding, and to regulate water usage for the future to mitigate potential impacts on both the environment and tourism.

These recommendations aim to secure a balanced and sustainable approach to water management and tourism development, ensuring that both can thrive harmoniously in the coming decade.

Acknowledgements:

The researcher would like to express their gratitude to United Analyse and Engineering Consultant Co., Ltd. (UAE) and Office of the National Water Resources for research grant and all stake-holders in the 5 northeastern provinces including Buengkan, Loei, Nongbualamphu, Nongkhai and Udonthani for their times and thoughts as well as ideas shared in the interview and the focus groups.

REFERENCES

- D'Este, G., Nunes, P. A., & Calheiros, M. M. (2019). *Water scarcity and tourism: An exploration of the impacts on destination competitiveness and community well-being*. *Tourism Management*, 70, 332-343. <https://doi.org/10.1016/j.tourman.2018.08.014>
- Department of Tourism (2020). Statistic of Tourists and income of northeastern region of Thailand. Retrieved 22 September 2022, from <https://www.dot.go.th/home>
- Gössling, S. (2015). *Tourism and water: Interactions, impacts and challenges*. *Journal of Sustainable Tourism*, 23(4), 493-508. <https://doi.org/10.1080/09669582.2014.990509>
- Office of the National Economic and Social Development Council (2020). Retrieved 23 September 2022, from <https://www.nesdc.go.th/main.php?filename=intro>
- Office of the National Water Resources (2019). Water Situation of northeastern region in Thailand. Retrieved 22 September 2022, from <http://www.onwr.go.th/>
- Office of the National Water Resources (2020). Water Situation of northeastern region in Thailand. Retrieved 22 September 2022, from <http://www.onwr.go.th/>
- Parker, S. (2019). *Water and tourism: Building a sustainable future*. In: A. Smith & L. A. Johnson (Eds.), *Tourism and Natural Resources Management* (pp. 83-102). Routledge.
- Thai Encyclopedia. (2020). Northeastern Region of Thailand. Retrieved September 20, 2022, from <https://saranukromthai.or.th/sub/book/book.php?book=18&chap=1&page=t18-1-infodetail03.html>
- Thailand Water Situation (2018). Report of weater and storm in northeastern area. Retrieved 23 September 2022, from <https://tiwrm.hii.or.th/current/YearlyReport2018/Storm.html>
- The Bureau of Registration Administration. (2021). Population of Northeastern region of Thailand. Retrieved 20 September, from <https://www.bora.dopa.go.th/home/>
- Tourism Authority of Thailand. (2009). Thailand Tourism Resources Northeastern Set, Tourism Authority of Thailand.
- Tourism Authority of Thailand. (2009). Thailand Tourism Resources Northeastern Set: Loei, Tourism Authority of Thailand.
- Tourism Authority of Thailand. (2009). Thailand Tourism Resources Northeastern Set: Nongkhai, Tourism Authority of Thailand.
- Tourism Authority of Thailand. (2009). Thailand Tourism Resources Northeastern Set: Nongbualamphu, Tourism Authority of Thailand.
- Tourism Authority of Thailand. (2009). Thailand Tourism Resources Northeastern Set: Udonthani, Tourism Authority of Thailand.
- Tourism Authority of Thailand. (2022). History & Geography & Geology. Retrieved September 15, 2022, from <https://www.tourismthailand.org/Articles/plan-your-trip-history-and-geography-geology>
- UN-Water. (2018). *Water and tourism: Why water is a key driver for tourism and sustainable development*. UN- Water Report. <https://www.unwater.org/publications/water-and-tourism/>
- Vörösmarty, C. J., McIntyre, P. B., Gessner, M. O., Dudgeon, D., Pringle, C. M., & Green, P. (2010). *Global threats to human water security and river biodiversity*. *Nature*, 467(7315), 555-561. <https://doi.org/10.1038/nature09440>