AMATA
POSSIBILITIES HAPPEN

Roadmap of Water Resources Management and Business Opportunities.

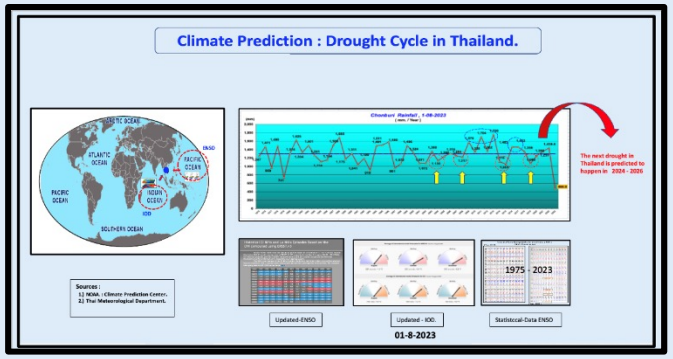
Mr. Chuchat Saitin

- Chief Project Development : Amata U Co., Ltd.
- Vice Chairman : Water and Environment Institute for Sustainability (WEIS)
  The Federation of Thai Industries (FTI)

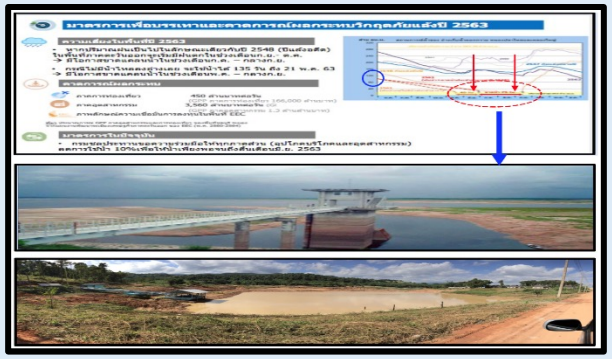
Topics :

(1) . The Overview of Water Crisis in Thailand.
(2) . Case study : Water Security Management for Amata City Industrial Estate, Thailand.

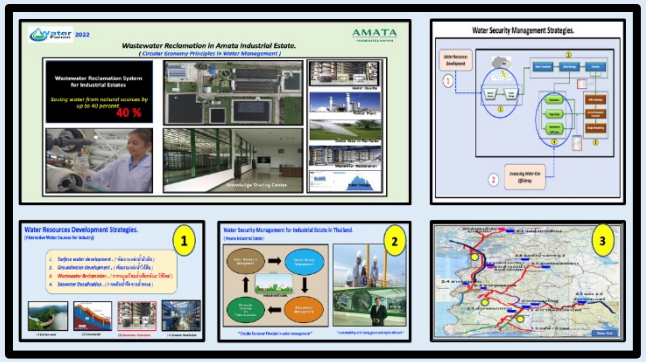
When ?



Impact ?



Solution ?



(1) Overview of water crisis in Thailand.

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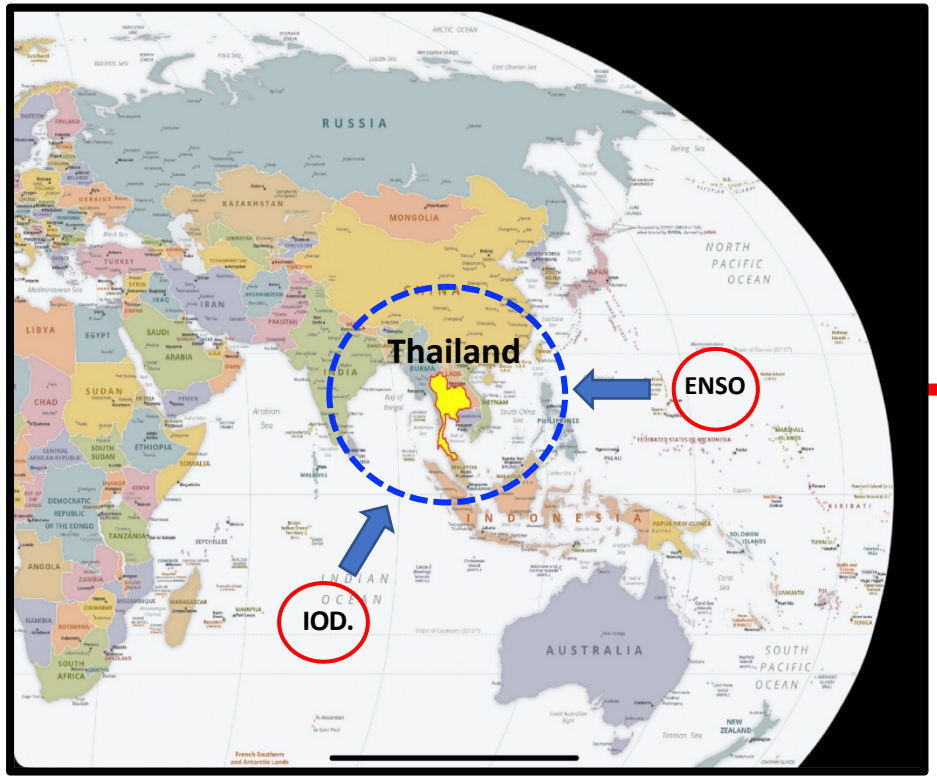
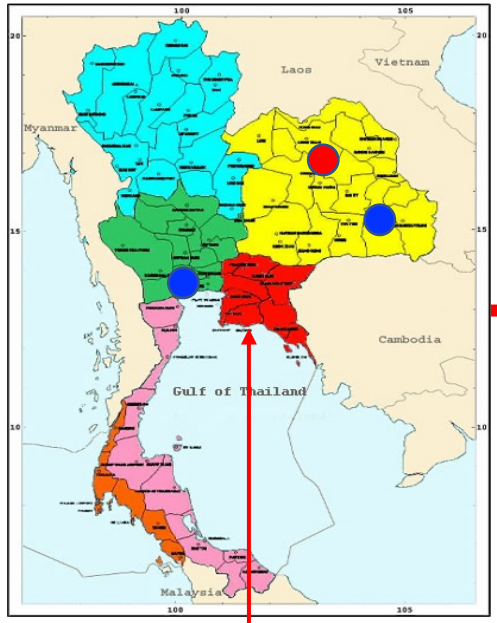
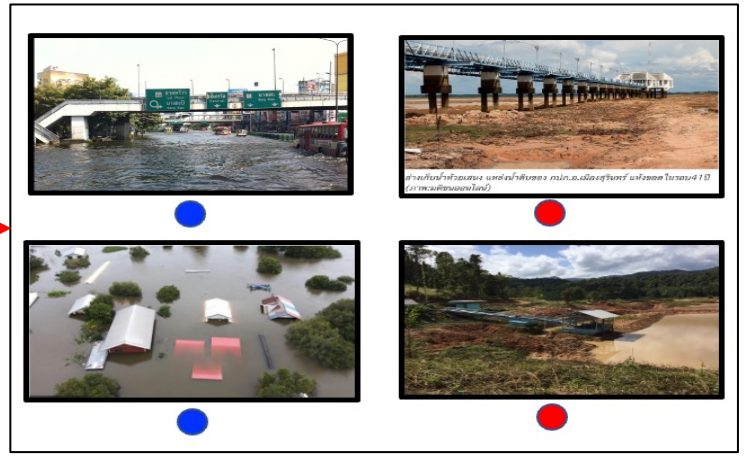
The Overview of Water Crises in Thailand

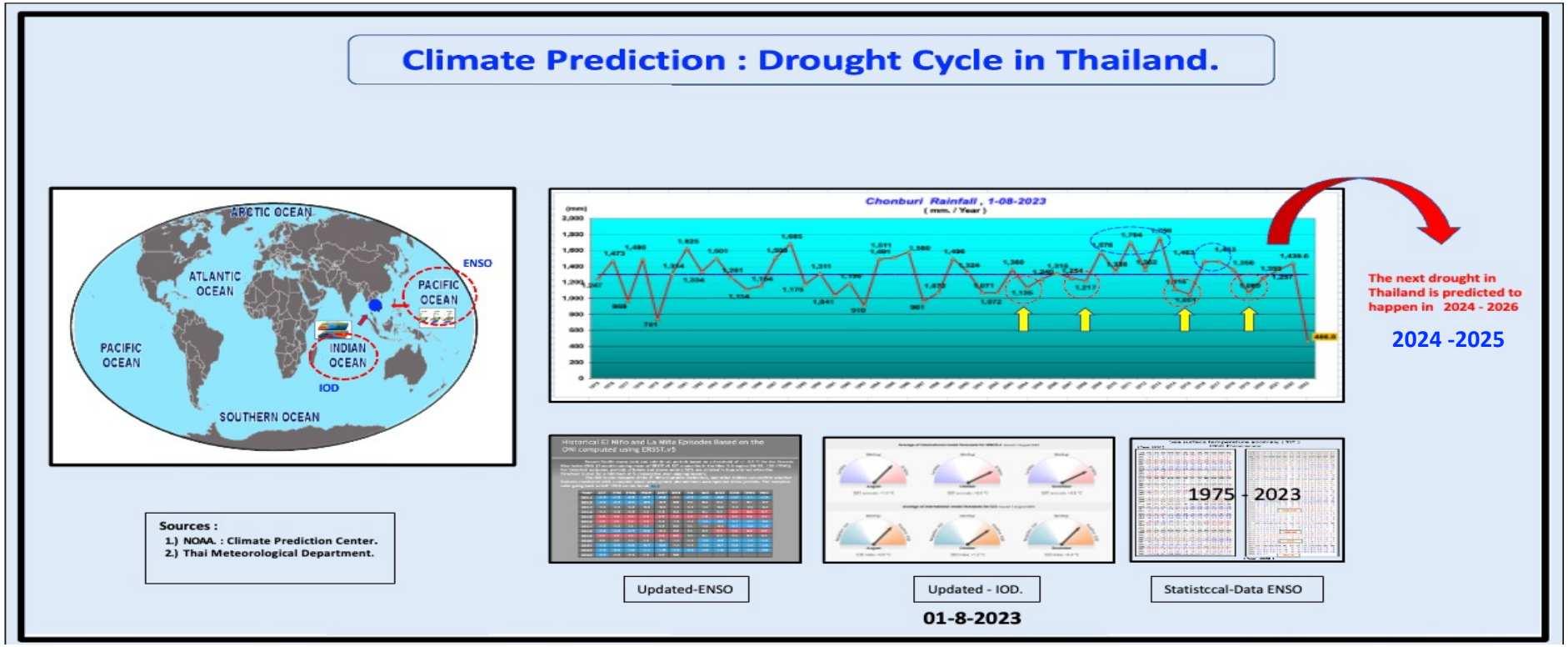






Thailand has faced several water crises in the past, primarily due to its geographical location and monsoon climate.
The water crises have had significant impacts on the country's economic growth, especially a severe drought in the eastern region.

Climate cycle observed in Thailand.



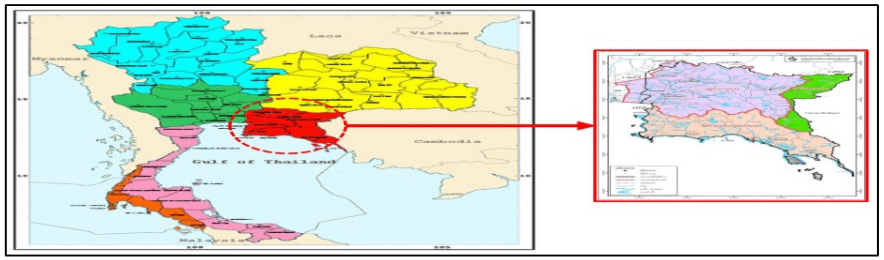
1). **According to ENSO phenomena.**

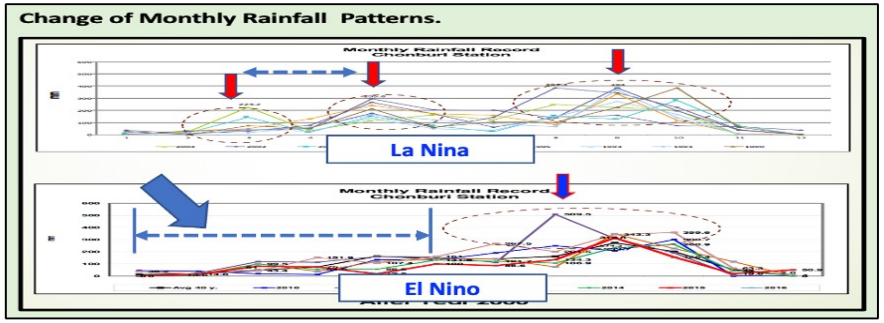
The statistical data of sea surface temperature anomalies (SST) and Rainfall anomalies over the past 40 years in the East Region of Thailand have a correlation and can be observed that the droughts occur in the east region of Thailand approximately every 4-5 years.

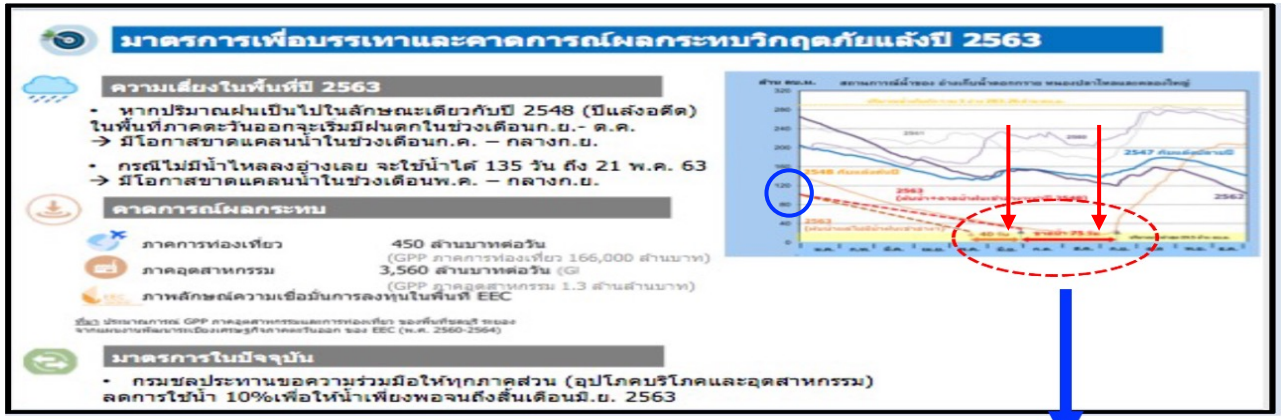
2) **The observation** identify pattern and predict the occurrence of droughts and floods in Thailand, helping the authorities can better plan and prepare for droughts and floods mitigation to minimize their impact on agriculture, industries and communities.

According to the ENSO phenomenon and Indian Ocean Dipole phenomenon, It is expected to be a severe drought with a longer period and bigger impact on Thailand in 2024 and 2025.

How ? The Drought impact on the Eastern Region.

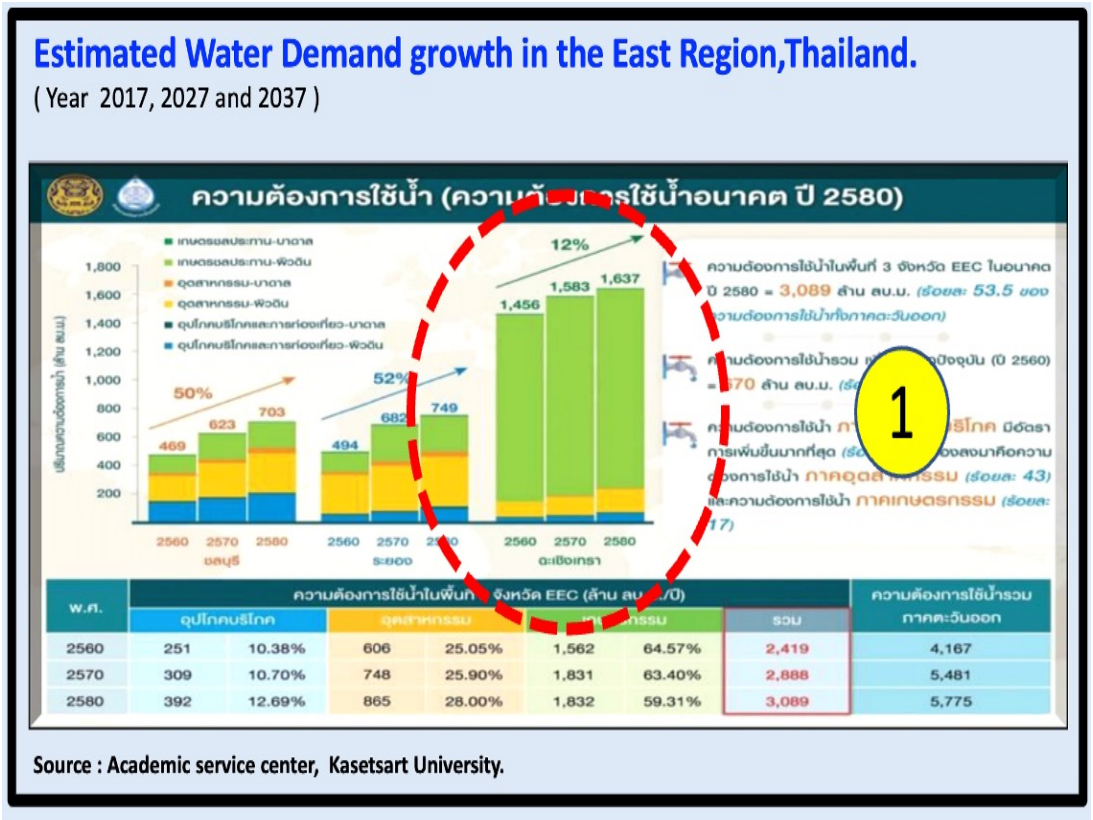






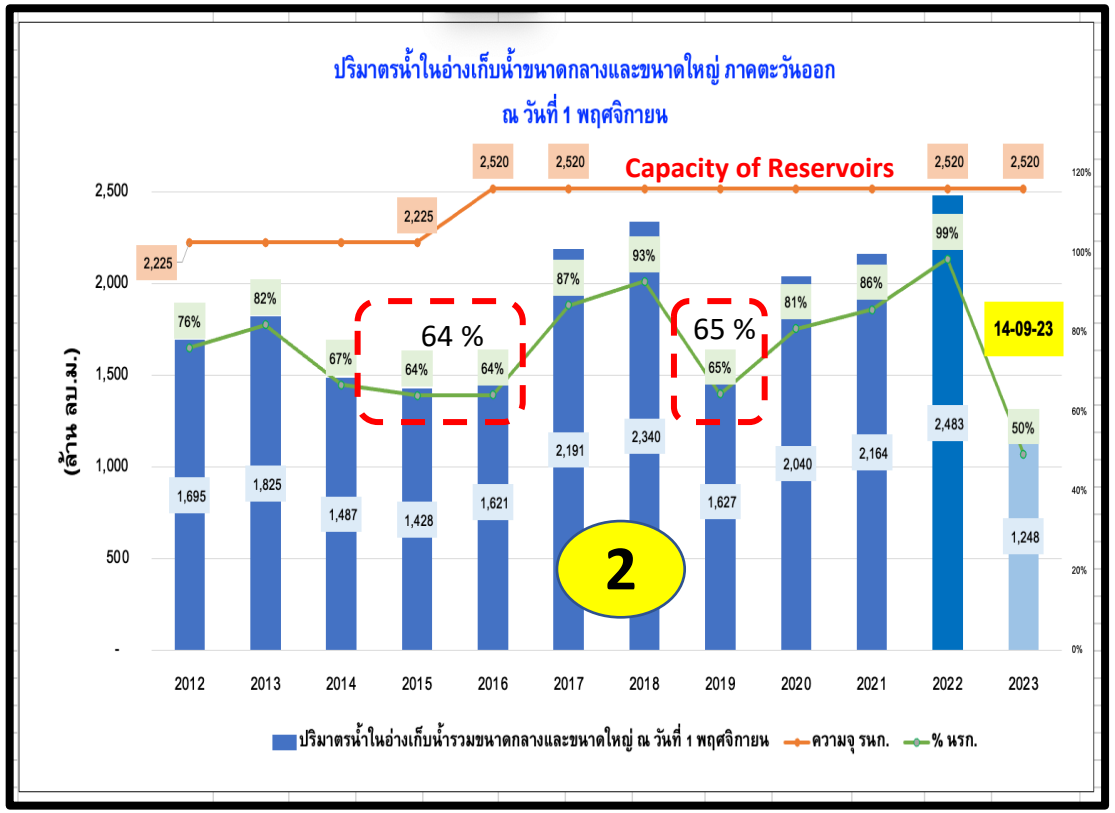
Predicted Water Demand and Supply Capacity in The Eastern Region.

WATER DEMAND GROWTH.

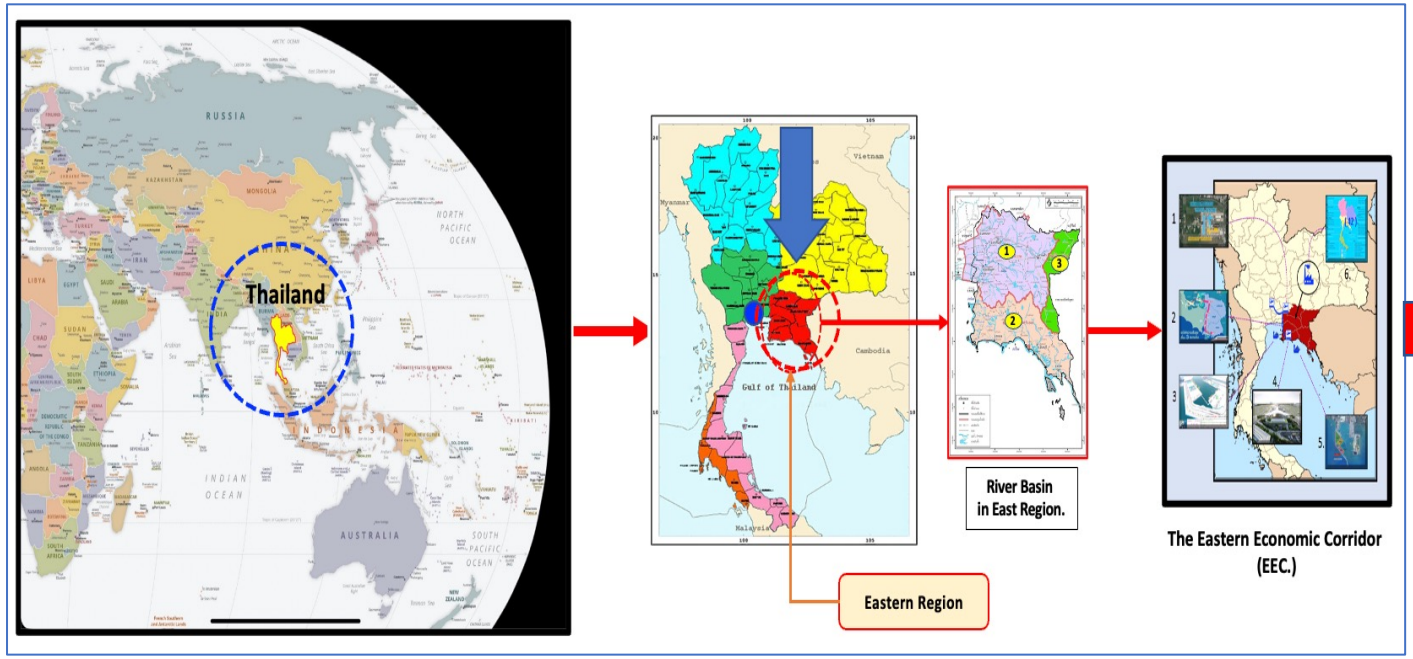


พ.ศ.	ความต้องการใช้น้ำในพื้นที่ 3 จังหวัด EEC (ล้าน ลบ.ม./ปี)							ความต้องการใช้น้ำรวมภาคตะวันออก
	อุปโภคบริโภค		อุตสาหกรรม		เกษตรกรรม		รวม	
2560	251	10.38%	606	25.05%	1,562	64.57%	2,419	4,167
2570	309	10.70%	748	25.90%	1,831	63.40%	2,888	5,481
2580	392	12.69%	865	28.00%	1,832	59.31%	3,089	5,775

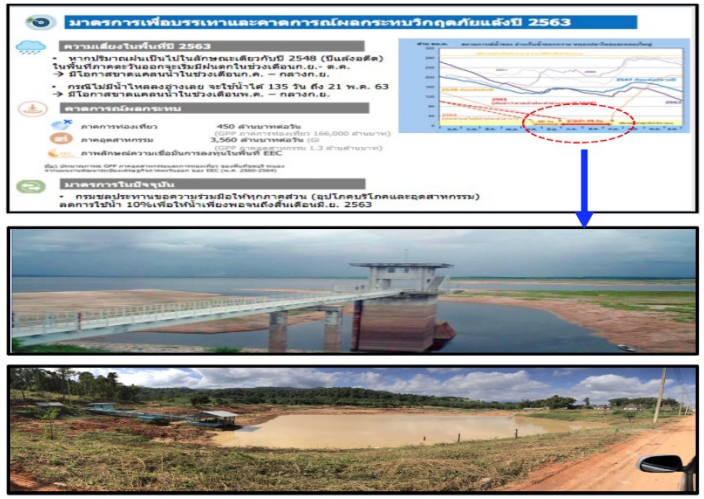
COLLECTED WATER IN ALL DAMS.



Predicted a Severe Drough in the Eastern Region , 2024-2025.



Impending Water Crisis



2024-2025

2.) Case Study : Water Security Management for Amata City Industrial Estates, in the Eastern Thailand.

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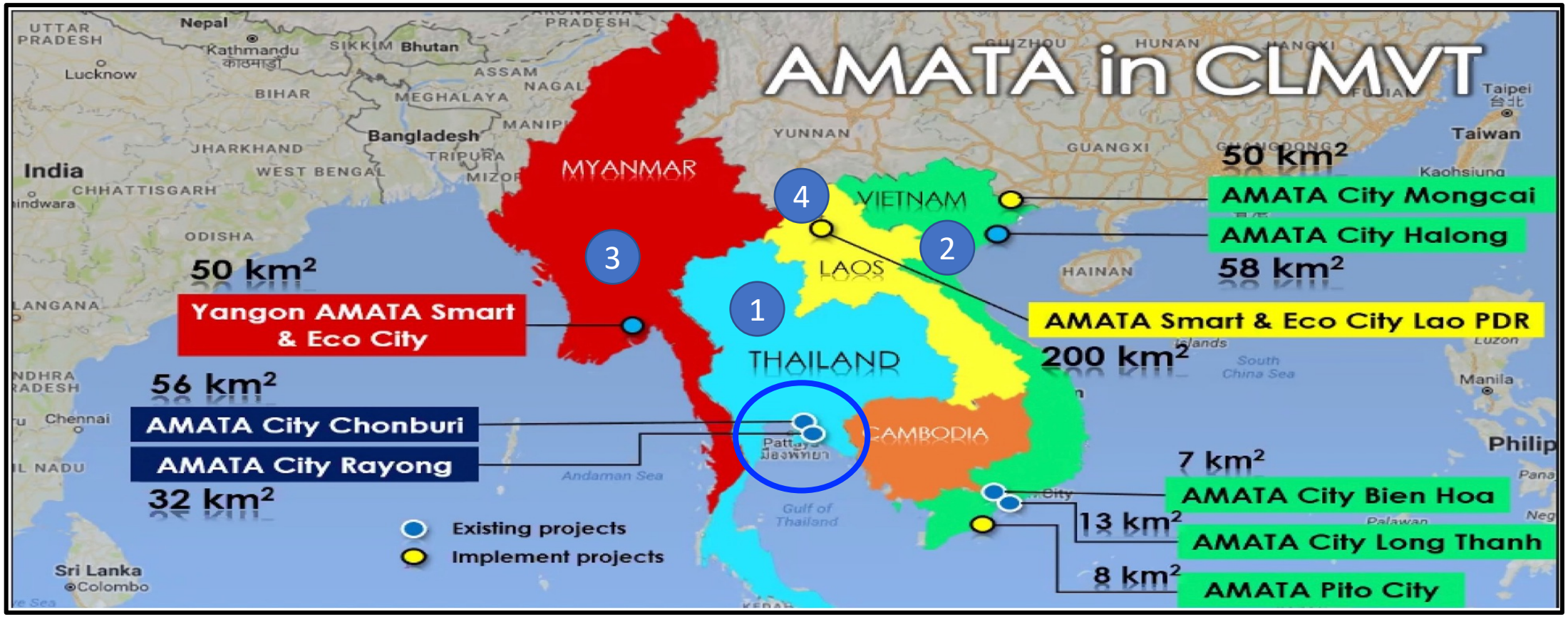
Amata City Industrial Estates in South East Asia



There are more than 1,200 factories operating in Amata City Industrial Estates in Thailand.

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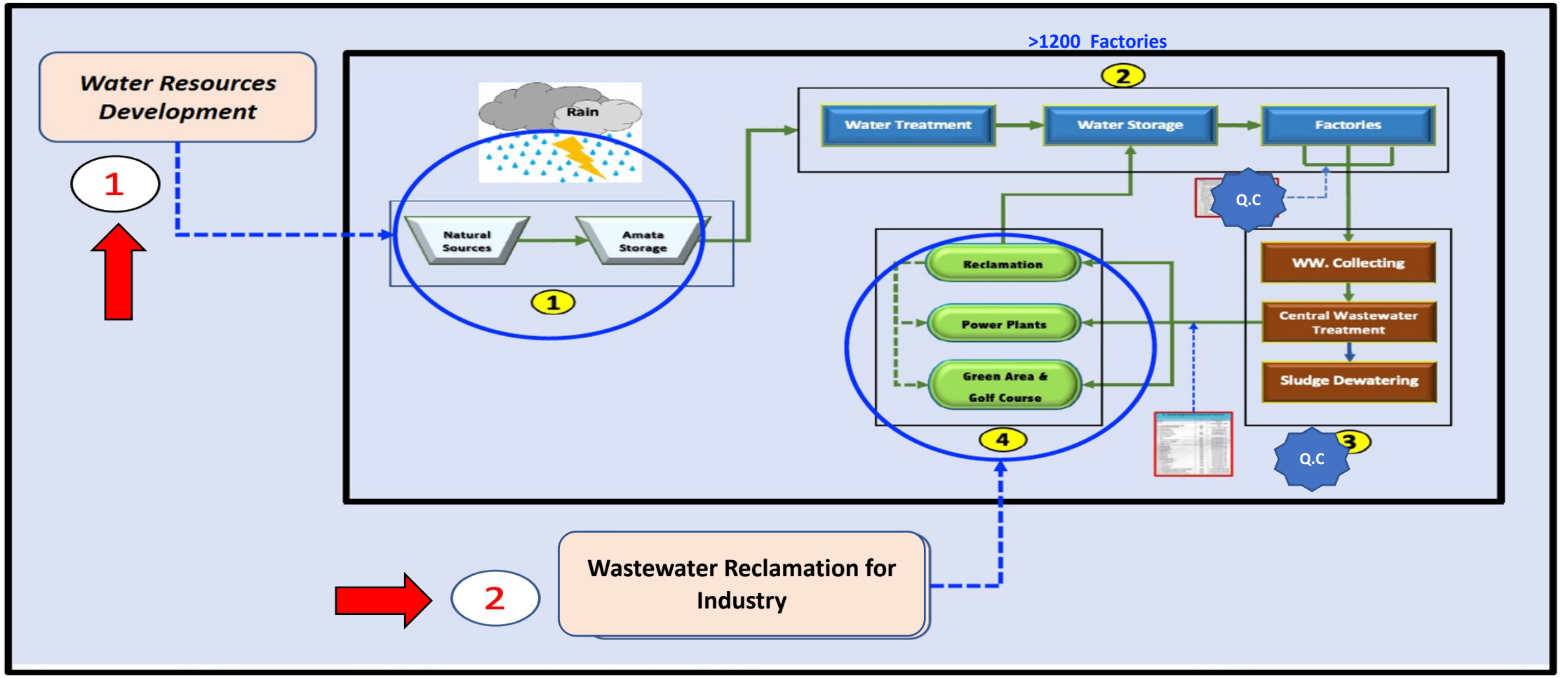
Amata U Company Limited.

Mission : Creating Sustainable Development
with
Water security - Environmental friendly - Harmonious society with quality of life.

INDUSTRY. **SOCIETY.** **ENVIRONMENT.**

Water Security Management Strategies.



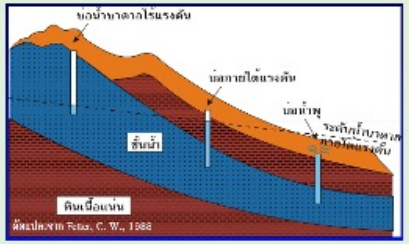
1.

Water Resource Development Strategy.

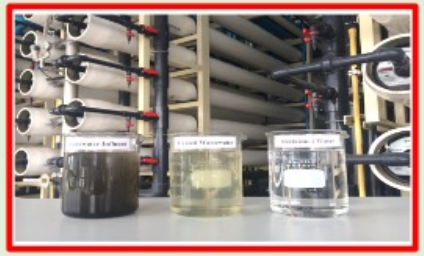
(Alternative sources of water)

1. *Surface water development . (พัฒนาแหล่งน้ำผิวดิน)*
2. *Groundwater development . (พัฒนาแหล่งน้ำใต้ดิน)*
3. ***Wastewater Reclamation . (การหมุนเวียนน้ำเสียกลับมาใช้ใหม่)***
4. *Seawater Desalination . (การผลิตน้ำจืดจากน้ำทะเล)*

(1) Surface water



(2) Groundwater



(3) Wastewater Reclamation

(4) Seawater Desalination

Since 2005, Alternative water resources has been being developed sequentially.

Water Resources Development in Amata City Industrial Estates

(Amata's Strategic Location)

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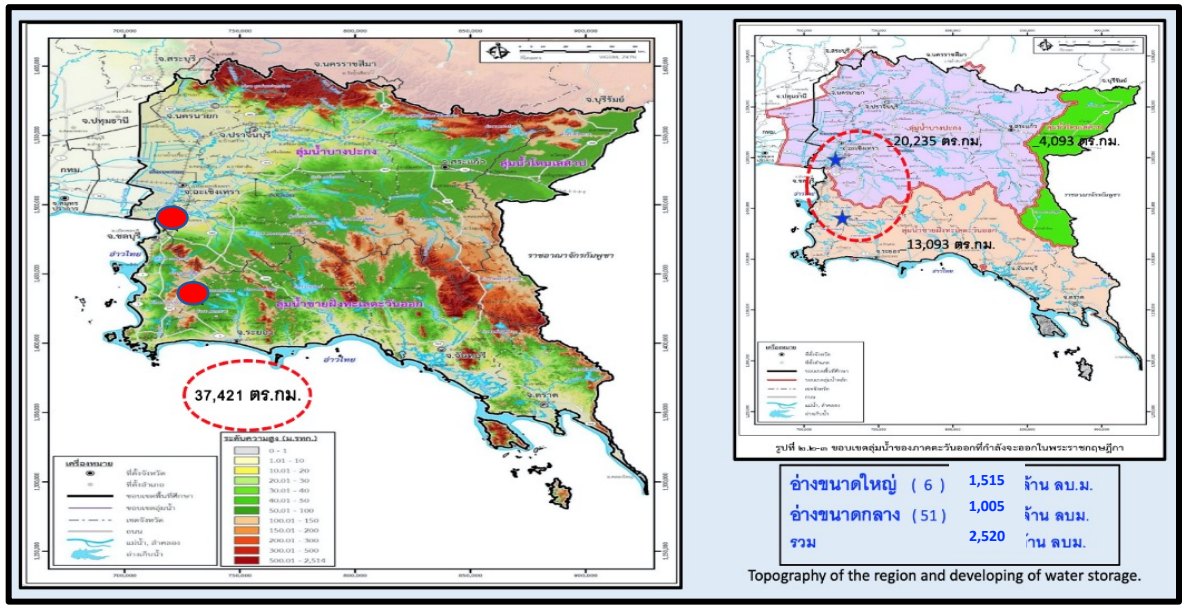
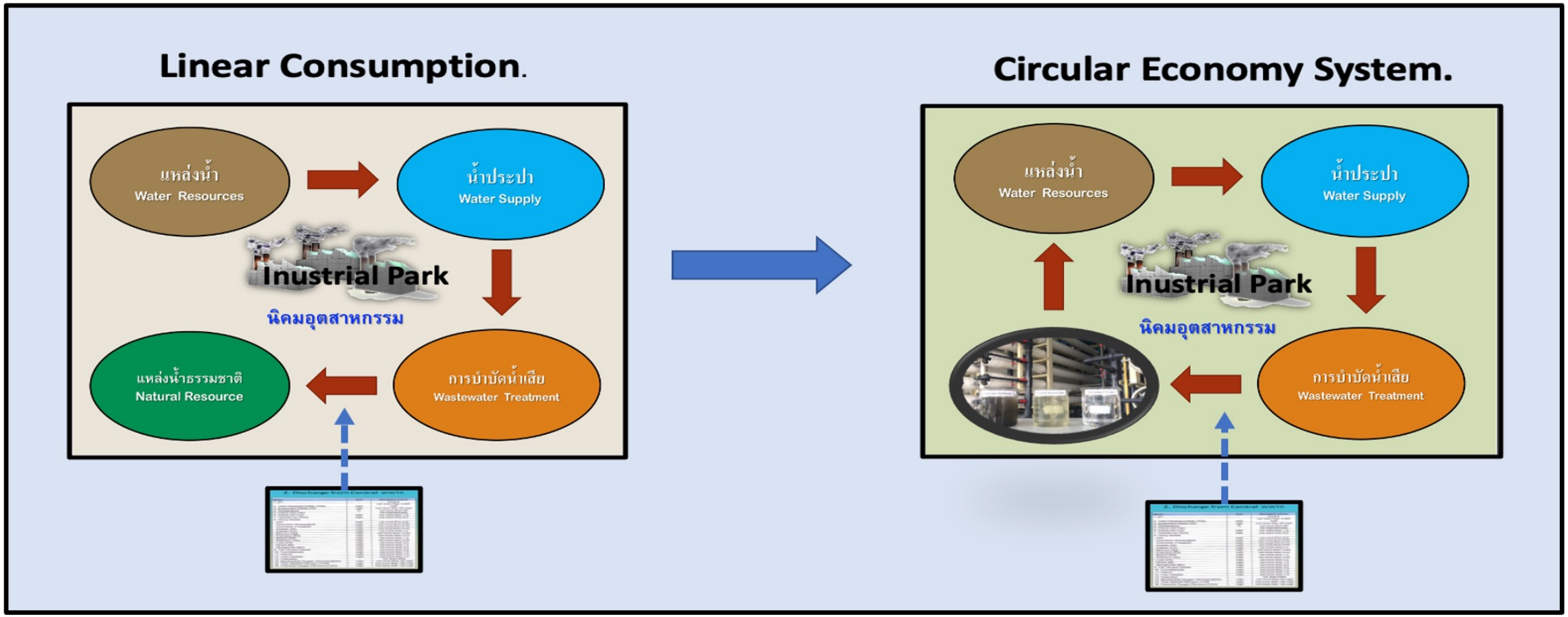


อ่างขนาดใหญ่ (6)	1,515	ล้าน ลบ.ม.
อ่างขนาดกลาง (51)	1,005	ล้าน ลบม.
รวม	2,520	ล้าน ลบม.

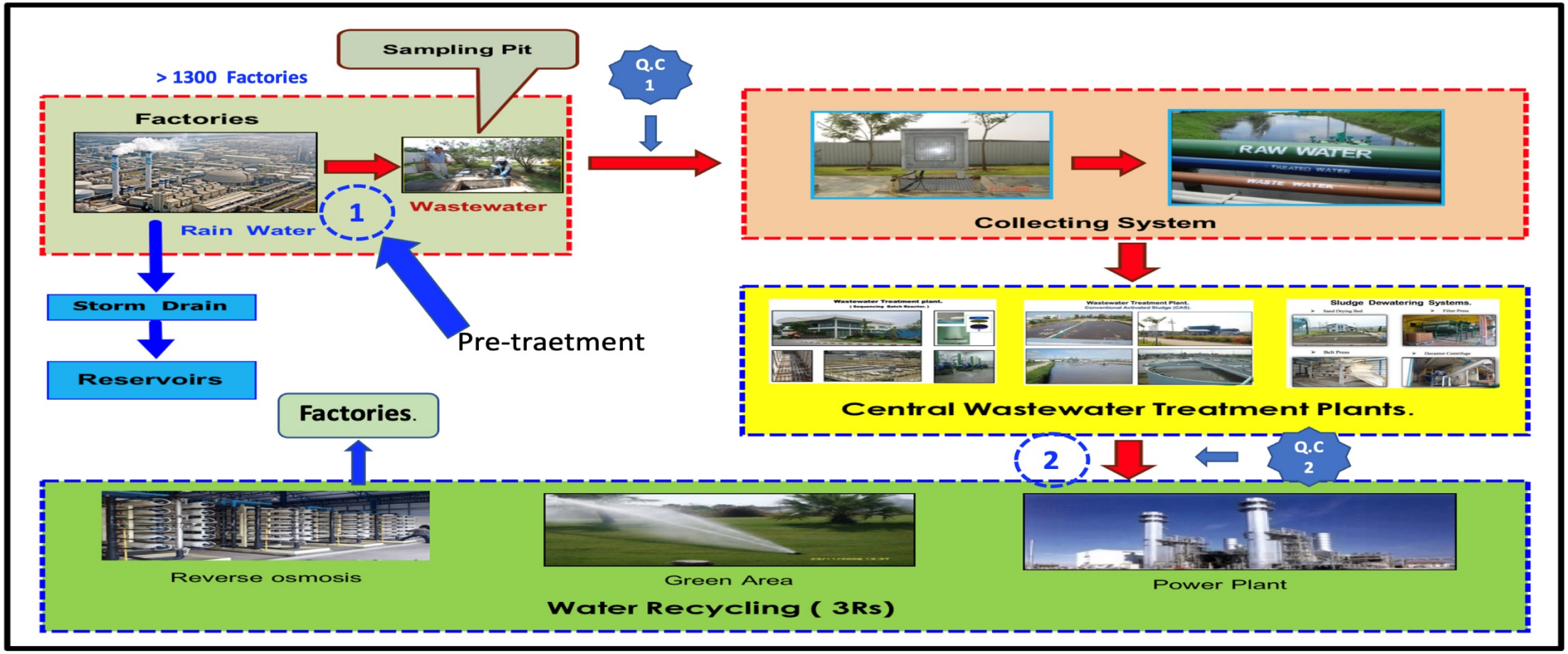
Topography of the region and developing of water storage.

2. Wastewater Reclamation system for Industry.



Transition of water management system from a linear consumption to a Circular Economy System in Water Management , Since 2008.

Wastewater Management system for Amata City Industrial Estate.



Wastewater-Discharged Quality Standard for Industrial Estate

QC-1. Discharge from factories.

Items	Unit	Standard values
1. Biochemical Oxygen Demand (BOD)	mg/l	not more than 500
2. Chemical Oxygen Demand (COD)	mg/l	not more than 750
3. Suspended Solid (SS)	mg/l	not more than 200
4.Total Dissolve Solid (TDS)	mg/l	not more than 3000
5. Total Kjeldahl Nitrogen (TKN)	mg/l	not more than 100
6. pH	-	5.5 – 9.0
7. Heavy Metal		
- Mercury (Hg)	mg/l	not more than 0.005
- Selenium (Se)	mg/l	not more than 0.02
- Cadmium (Cd)	mg/l	not more than 0.03
- Lead (Pb)	mg/l	not more than 0.2
- Arsenic (As)	mg/l	not more than 0.25
- Chromium (Cr^{3+})	mg/l	not more than 0.75
- Chromium (Cr^{6+})	mg/l	not more than 0.25
- Barium (Ba)	mg/l	not more than 1.0
- Nickel (Ni)	mg/l	not more than 1.0
- Copper (Cu)	mg/l	not more than 1.0
- Zinc (Zn)	mg/l	not more than 5.0
- Manganese (Mn)	mg/l	not more than 5.0
- Silver (Ag)	mg/l	not more than 1.0
8. Total iron	mg/l	not more than 10
9. Fluoride (F)	mg/l	not more than 5
10. Sulfide	mg/l	not more than 1.0
11. Cyanide as HCN	mg/l	not more than 0.2
12. Formaldehyde	mg/l	not more than 1.0
13. Phenols Compound	mg/l	not more than 1.0
14. Chloride asCL_2	mg/l	not more than 2000
15. Free Chlorine	mg/l	not more than 1.0
16. Pesticide	-	not allowed
17. Temperature	°C	not more than 45
18. Color	-	not appear
19. Odor	-	not appear
20. Oil & Grease	mg/l	10.0
21. Radioactive	-	not allowed
22. Surfactant (Synthetic Detergent)	mg/l	not more than 30.0

QC-1

QC- 2. Discharge from Central WWTP.

Items	Unit	Standard values
1. pH	-	5.5-9.0
2. Total Dissolved Solids (TDS)	mg/l	not more than 3,000 mg/l
3. Suspended Solids (SS)	mg/l	not more than 50 mg/l
4. Temperature	°C	not more than 40
5. Colour and Odor	-	not objectionable
6. Sulfide (as H_2S)	mg/l	not more than 1.0
7. Cyanide (as HCN)	mg/l	not more than 0.2
8. Heavy Metals		
- Zinc	mg/l	not more than 5.0
- Chromium (Hexavalent)	mg/l	not more than 0.25
- Chromium (Trivalent)	mg/l	not more than 0.75
- Arsenic (As)	mg/l	not more than 0.25
- Copper (Cu)	mg/l	not more than 2.0
- Mercury (Hg)	mg/l	not more than 0.005
- Cadmium (Cd)	mg/l	not more than 0.03
- Barium (Ba)	mg/l	not more than 1.0
- Selenium (Se)	mg/l	not more than 0.02
- Lead (Pb)	mg/l	not more than 0.2
- Nickel (Ni)	mg/l	not more than 1.0
- Manganese (Mn)	mg/l	not more than 5.0
9. Fat, Oil and Grease	mg/l	not more than 5.0
10. Formaldehyde	mg/l	not more than 1.0
11. Phenol	mg/l	not more than 1.0
12. Free Chlorine	mg/l	not more than 1.0
13. Pesticides	-	not detectable
14. Biochemical Oxygen Demand (BOD)	mg/l	not more than 20 mg/l
15. Total Kjeldahl Nitrogen (TKN)	mg/l	not more than 100 mg/l
16. Chemical Oxygen Demand (COD)	mg/l	not more than 120 mg/l

QC-2

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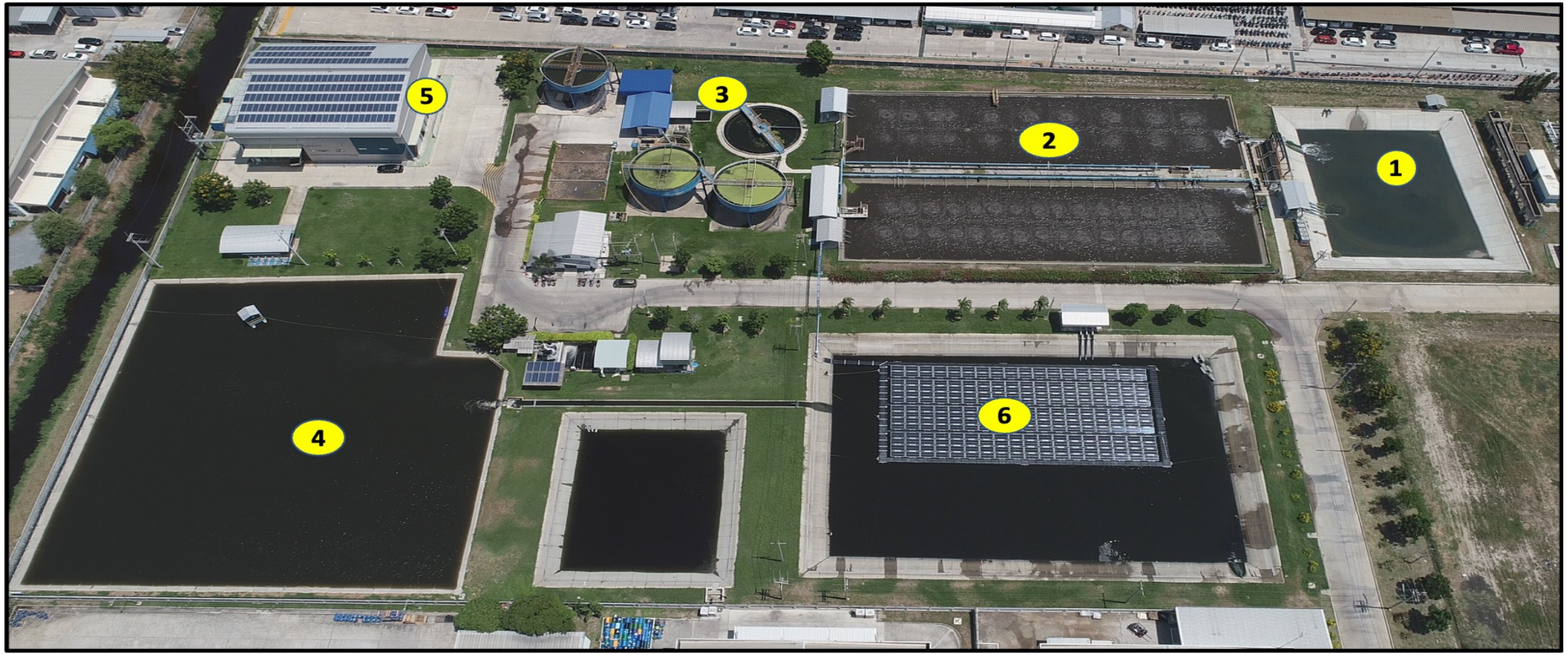
Wastewater Reclamation system in Amata City Industrial Estate.



Saving 40 % of Water resouces by Wastewater Reclamation System

Water Forum

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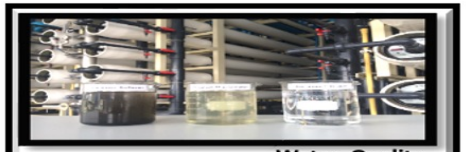
Wastewater Reclamation in Amata Industrial Estate.

(Circular Economy Principles in Water Management)

Wastewater Reclamation System for Industrial Estates

Saving water from natural sources by up to 40 percent.


Water Quality


Power Plant.


Green Area in The Parks.


Wastewter Reclamation


Solar Energy

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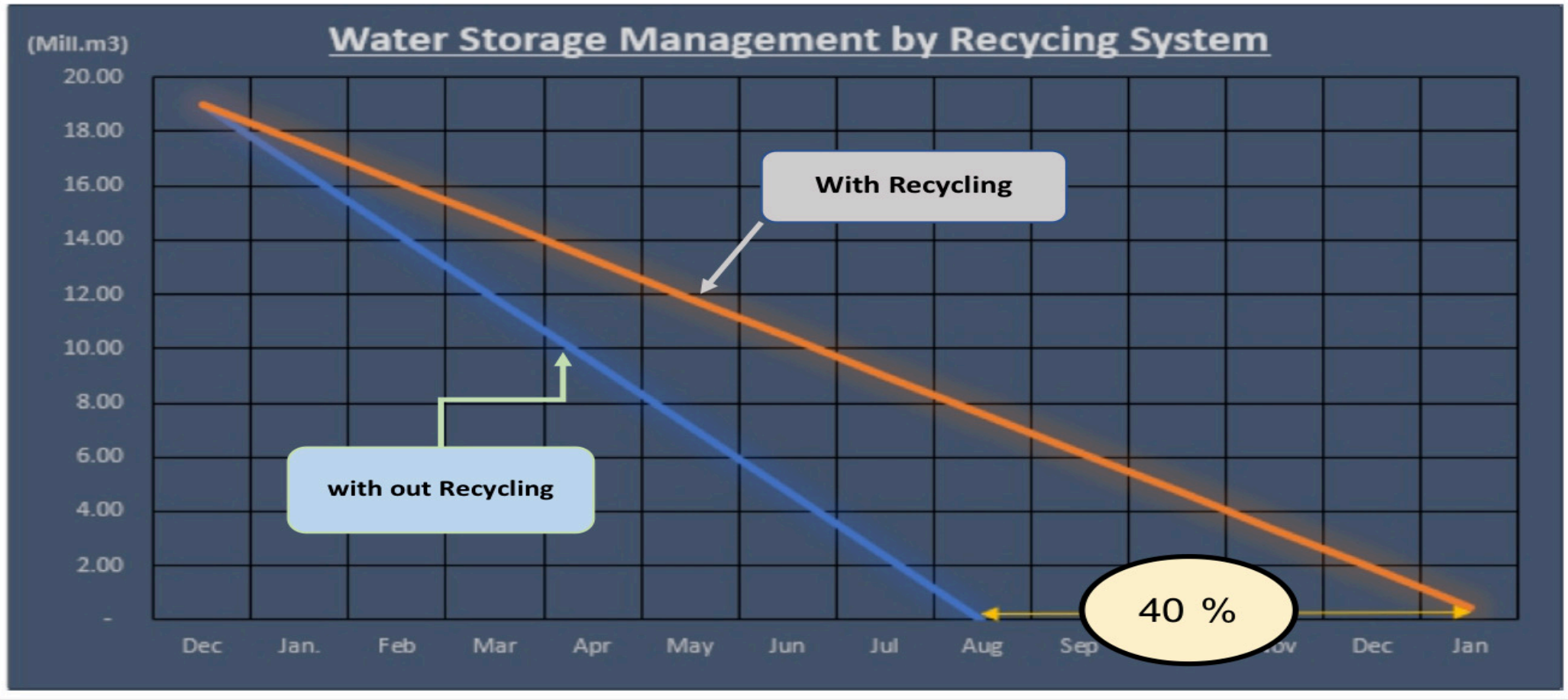
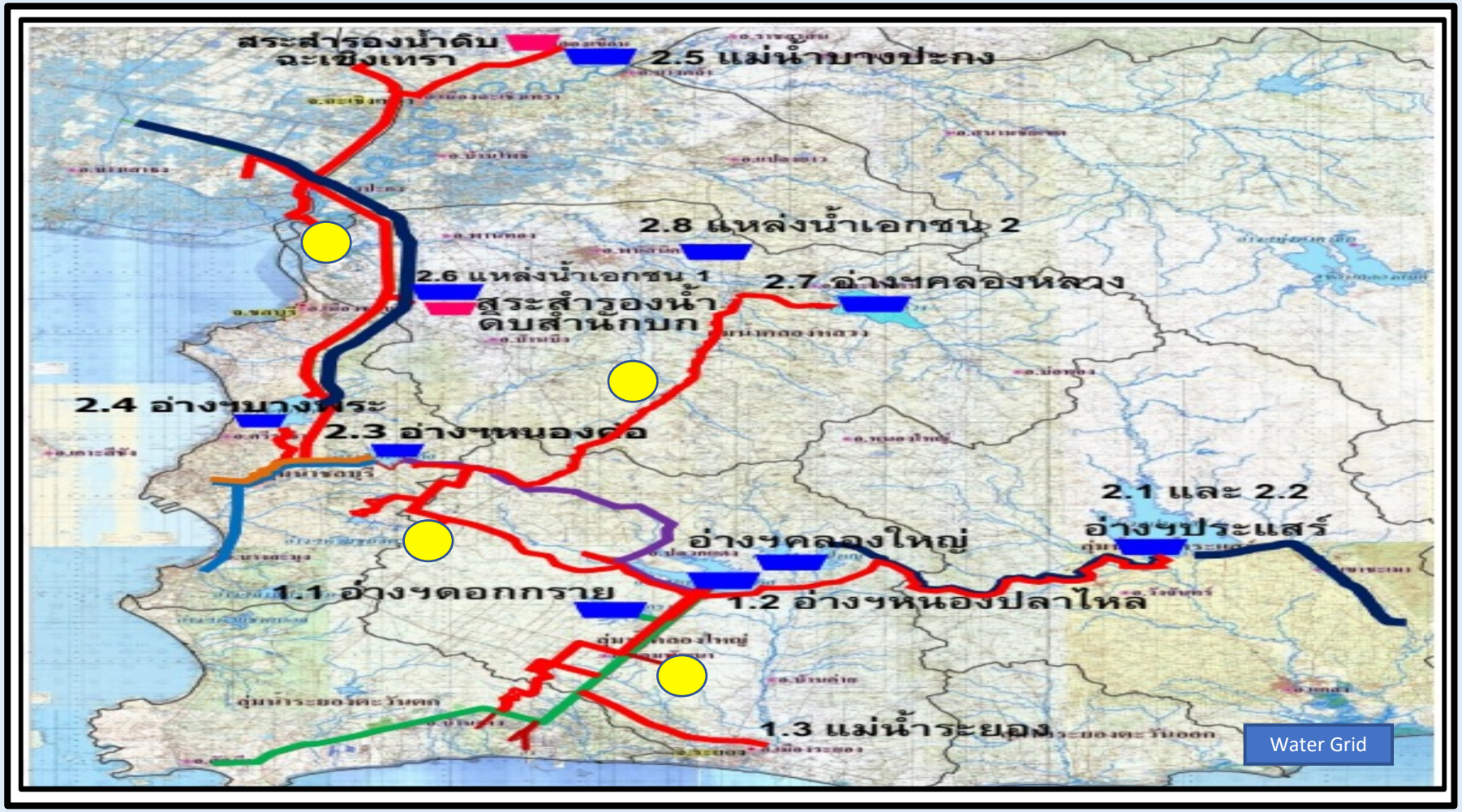
Wastewater Recycling and Reserviors Utilization.

จัดการอ่างเก็บน้ำ ร่วมกับ ระบบรีไซเคิลน้ำเสีย



Water Security through Reservoirs and a Water grid management.



Water storage capacity in the eastern region of Thailand!

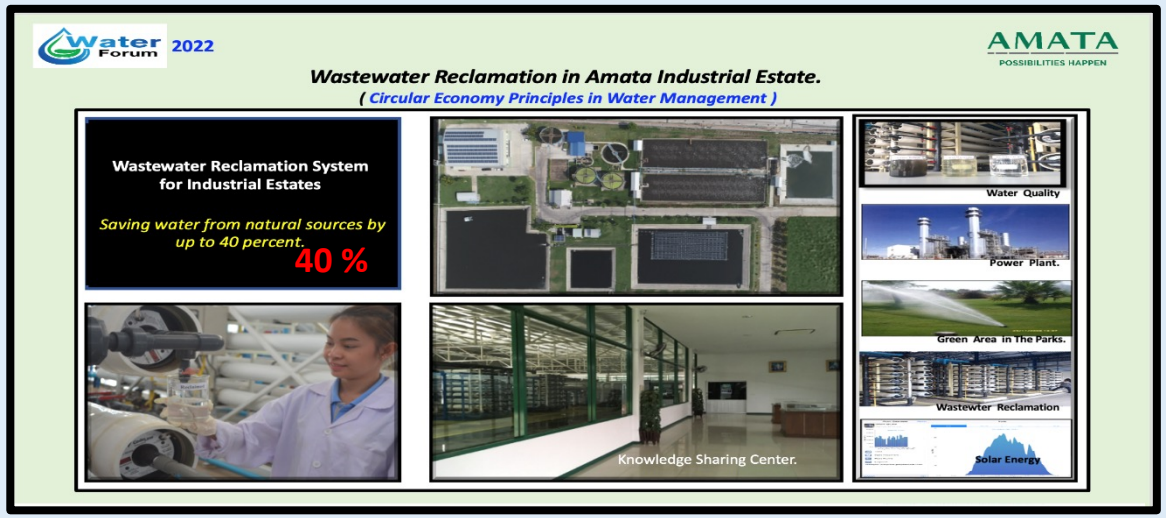
Reservoirs are vital for water management, including irrigation, flood control, and ensuring a steady supply of water for various sectors such as agriculture, industry, and domestic use.

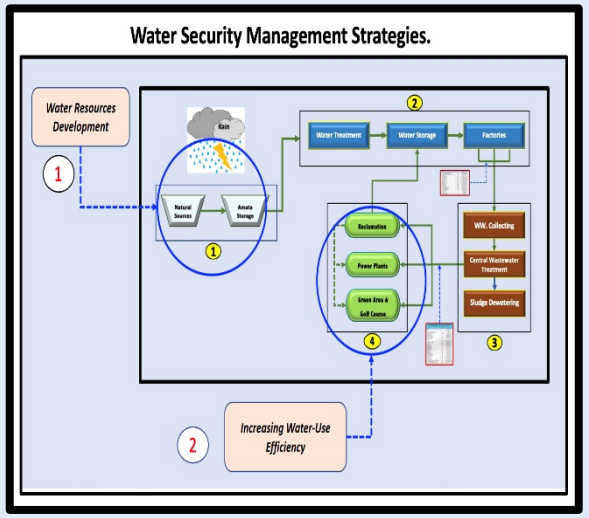
Having a total capacity of approximately 2520 million cubic meters of water in reservoirs can help mitigate the impact of water crises, such as droughts and floods, and support economic activities in the region.

Water Grid :

A water grid facilitates the transportation of water from reservoirs to areas facing water scarcity across the region. This interconnected network ensures that water can be efficiently transferred to areas in need, minimizing the impact of droughts or other water shortages.

3 Key-Success Factors for Water Security Management.
in The Eastern Region, Thailand.

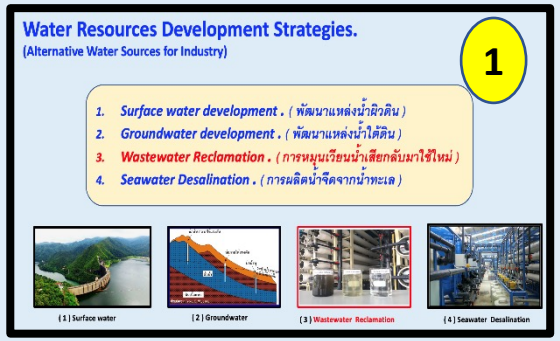


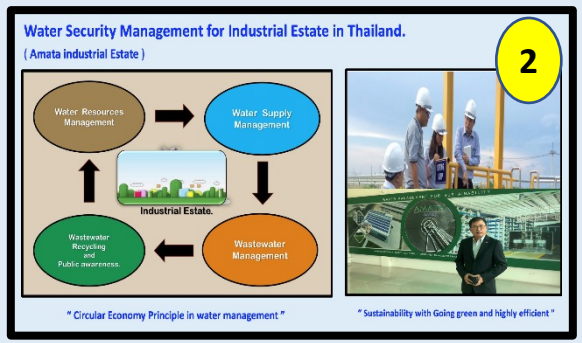


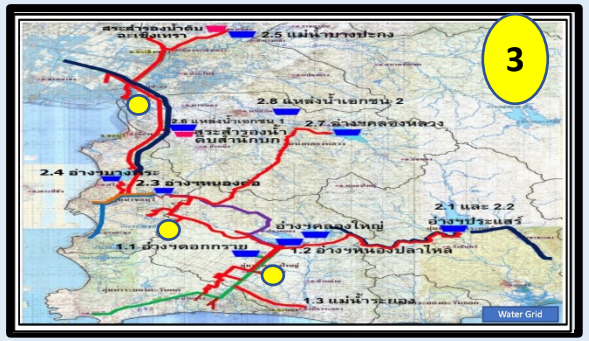
1. **Water Resource Development :**
   Water resource needed to be developed sequentailly from surface water , groundwater and seawater desalination

2. **Wastewater Recyclamation for Industry :**
   Implementing a cicular economy principle in water management by mean of reduce, reuse and recycle (3Rs.) concept can save water up to 40 % of water-use from natural resources

3. **Water Grid Management :**
   A water grid facilitates the transportation of water from reservoirs to areas facing water scarcity and ensures that water can be efficiently transferred to regions in need, minimizing the impact of droughts or other water shortage.







“ Let’s save the Earth”

Q&A. ….THANK YOU …