

Innovation for Groundwater Management towards SDGs in Thailand



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Technical Presentation

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THA 2022 International Conference on
Moving Towards a Sustainable Water and
Climate Change Management After COVID-19



Wat Saman Rattanaram



Wat Saman Rattanaram

วัดสมานรัตนาราม

4.5 ★★★★★ 12,312 reviews

Buddhist temple



Directions



Save



Nearby



Send to your
phone

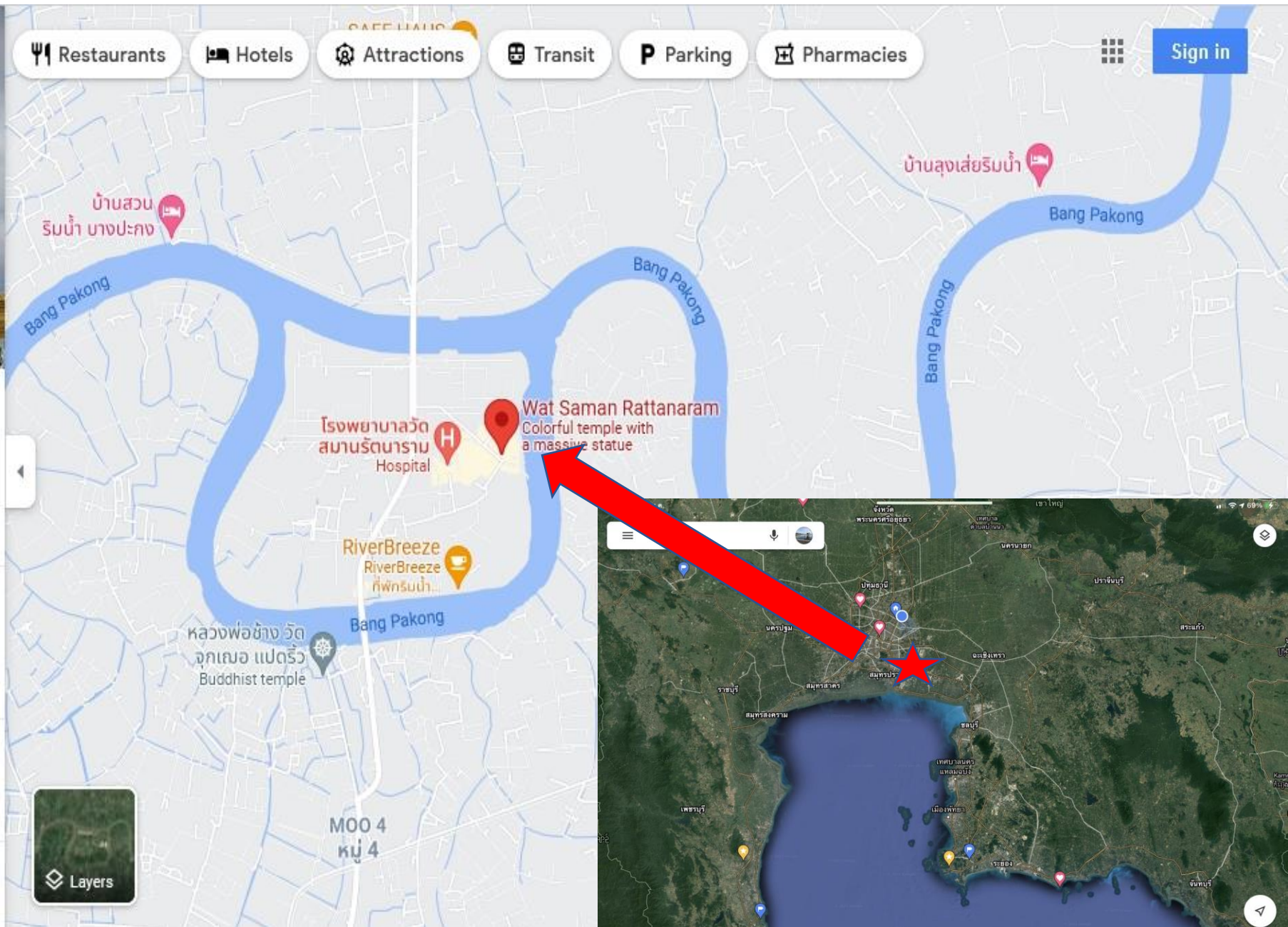


Share

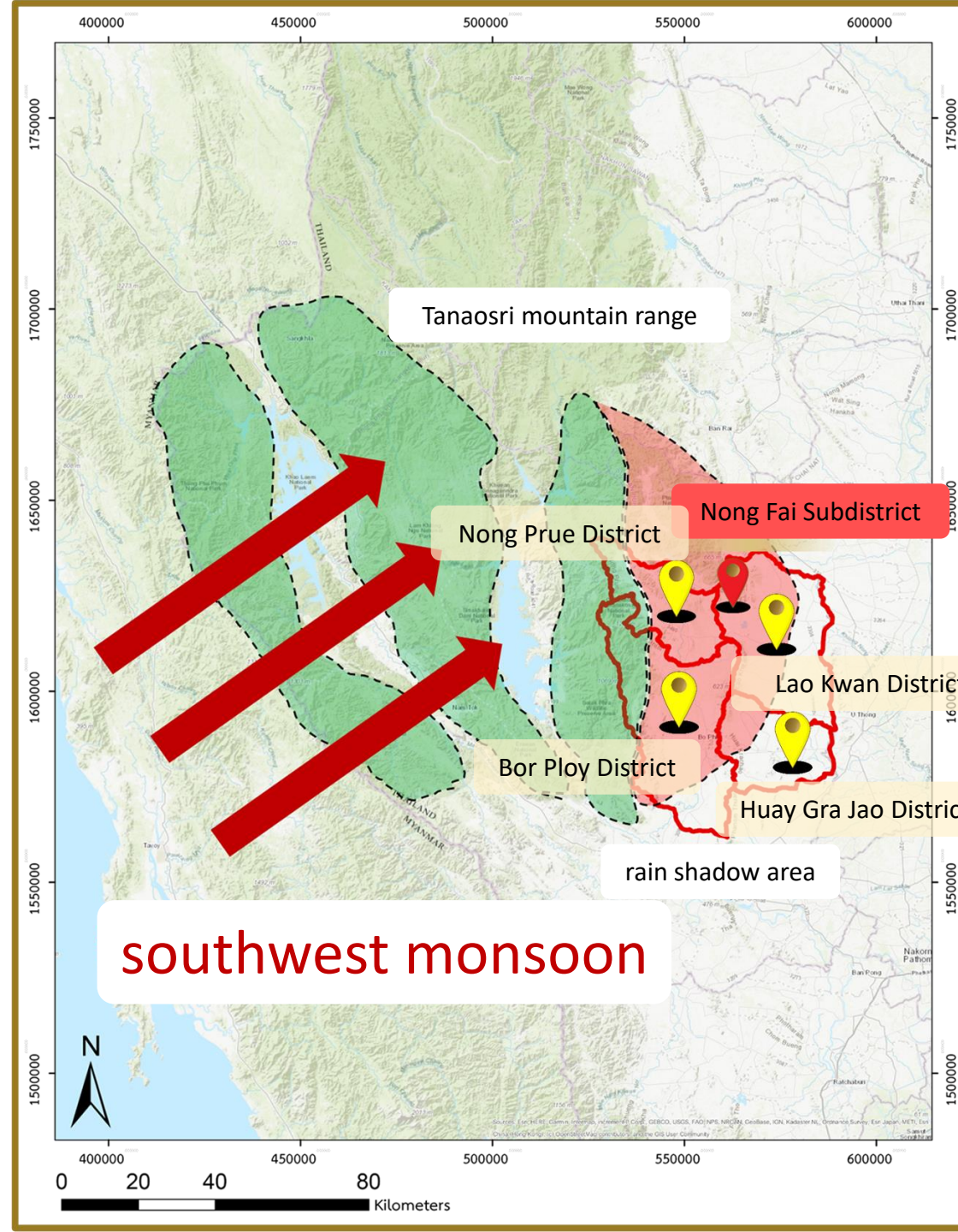
A giant pink statue of a Hindu deity is the main attraction at this flashy, theme park-like temple. >



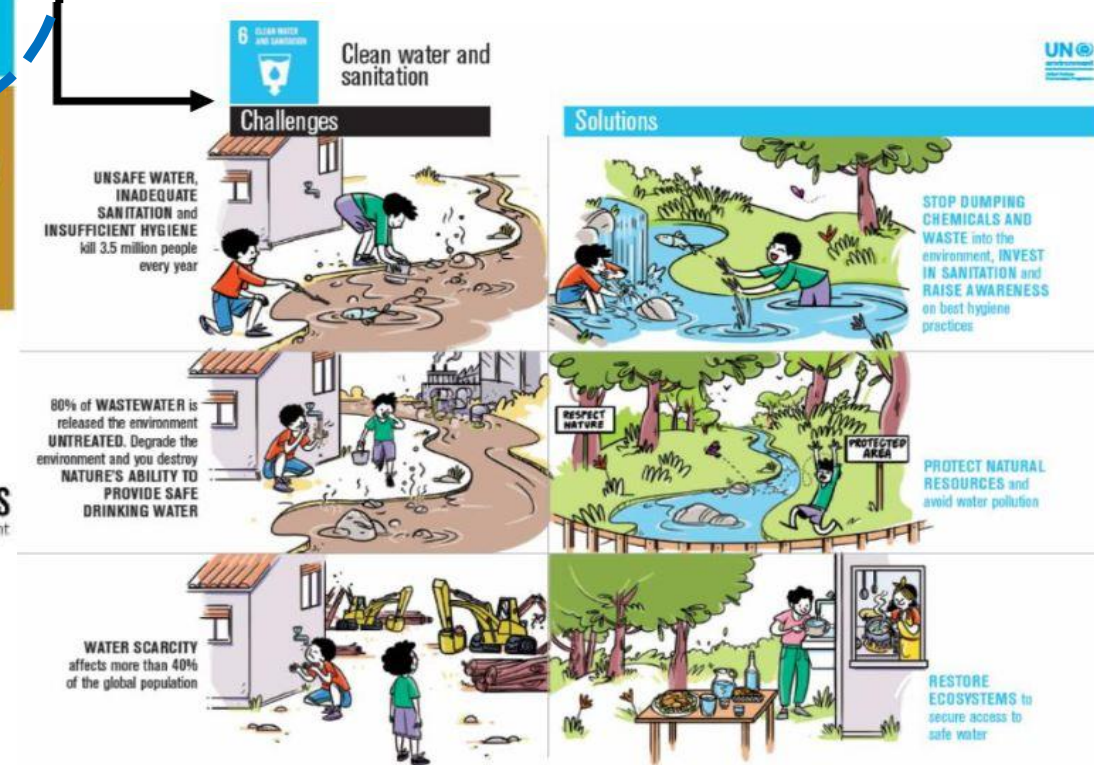
Thanon O Bo To Chachoengsao 2012, Kon Kaeo,
Mueang Chachoengsao District. Chachoengsao







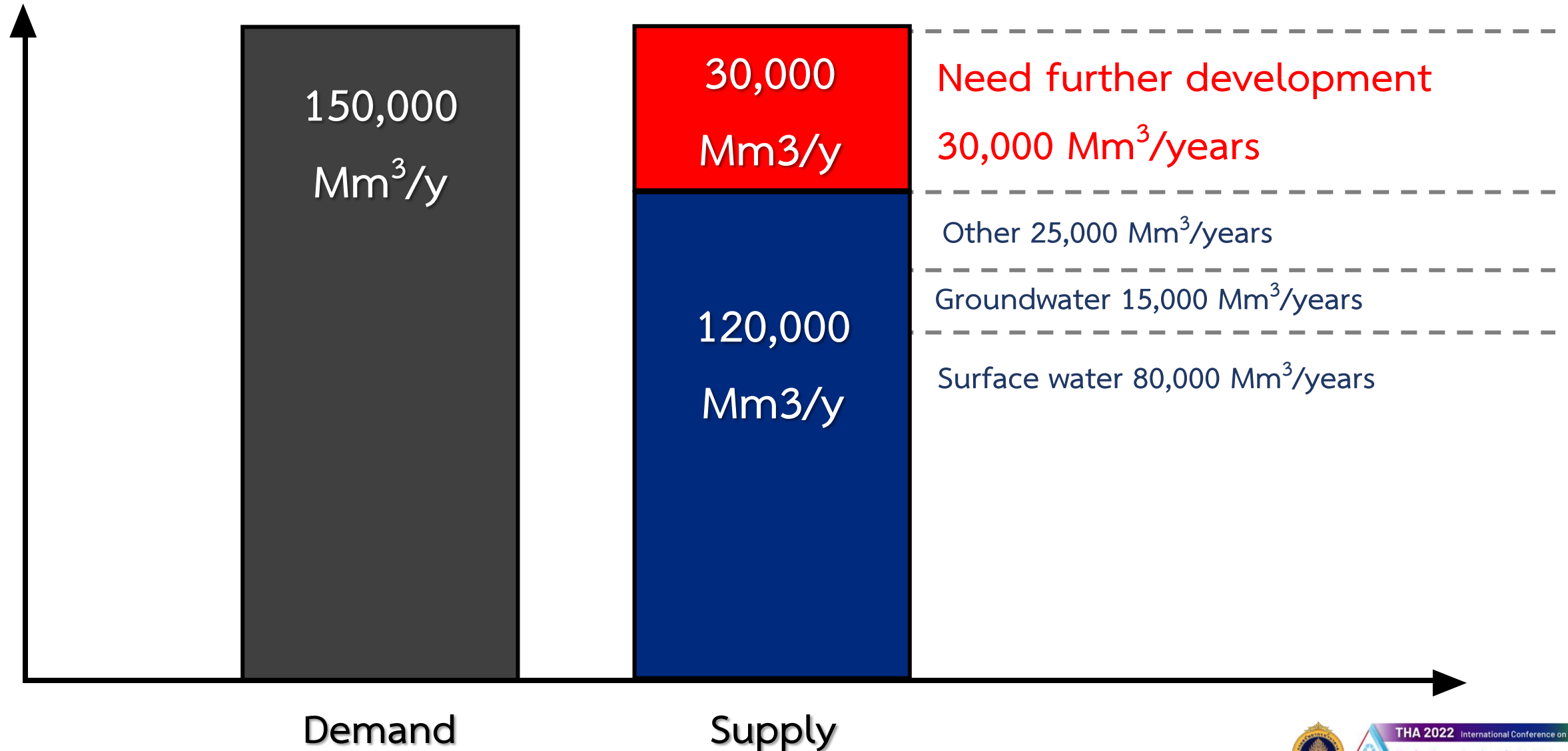
The Sustainable Development Goals



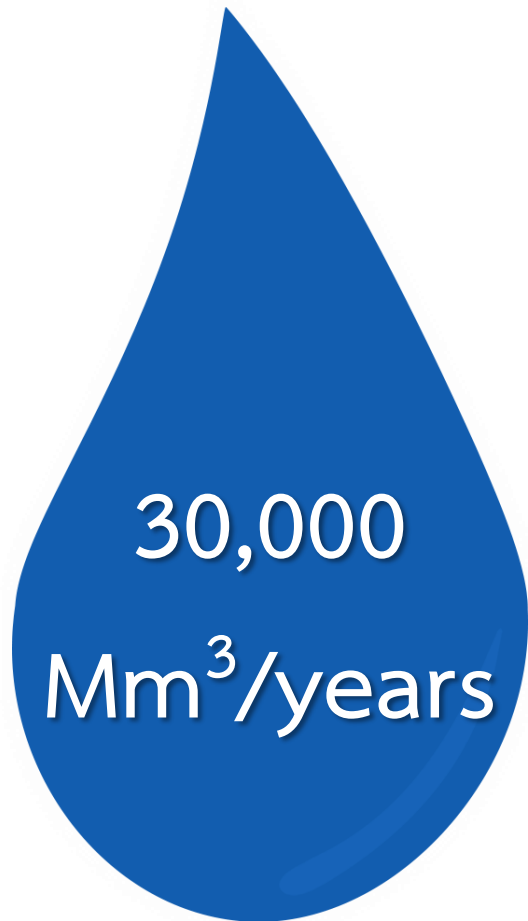
SDGs 6

Ensure availability and sustainable management of water and sanitation for all

Water demand management in Thailand



Water demand management in Thailand



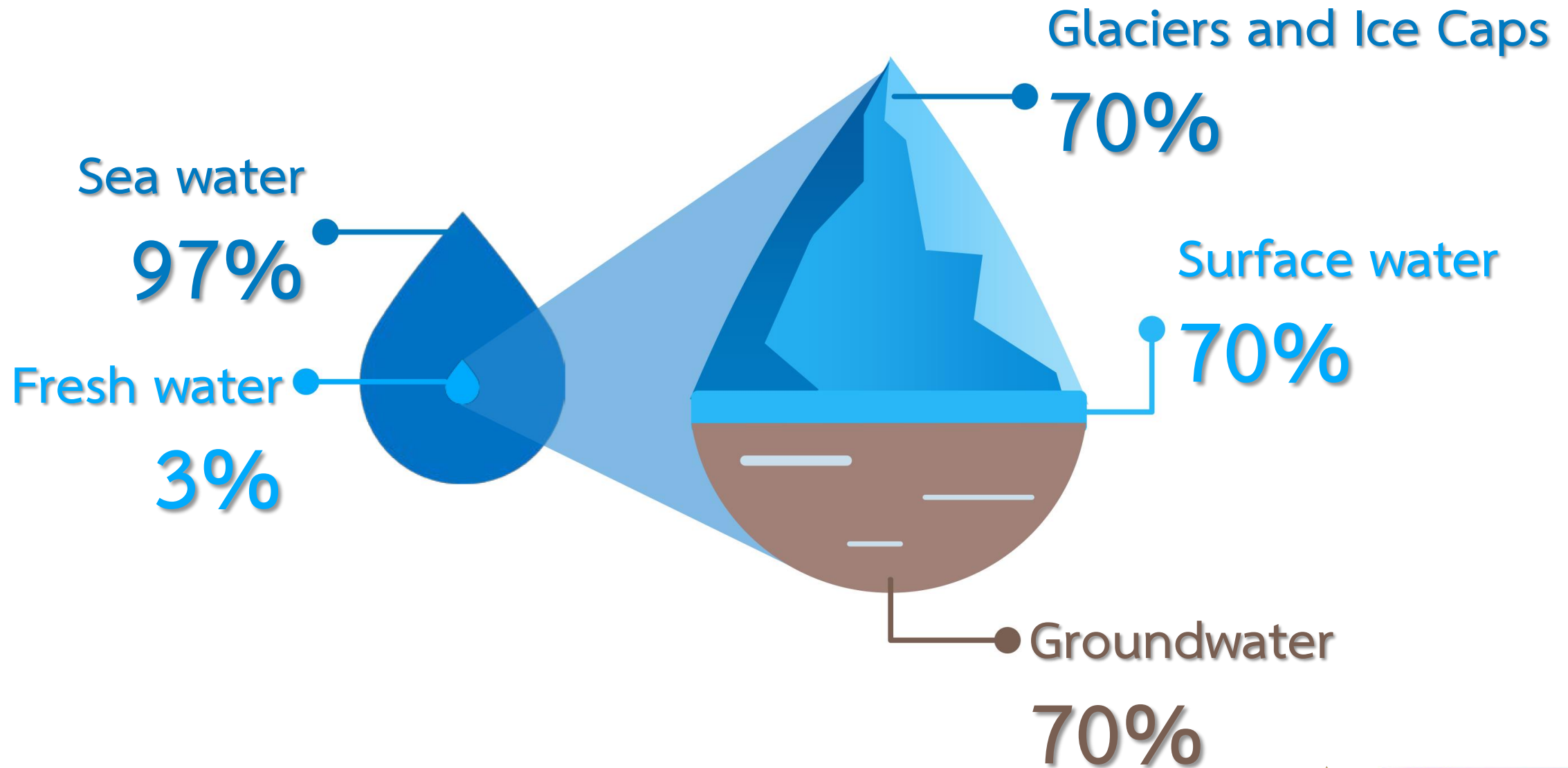
Option 1



Option 2



World Water Allocation



Thailand Hydrologic Cycle



Annual Rain Fall : 1,573 mm/y

Rain Volume : 804,372 Mm³/y (100%)

Surface Water : 213,423 Mm³/y (25%)

Storage 80,000 Mm³ (10%)

Evaporation
489,949 Mm³/y (60%)

GW Recharge : 101,000 Mm³/y (15%)

GW Storage : 1,131,959 Mm³

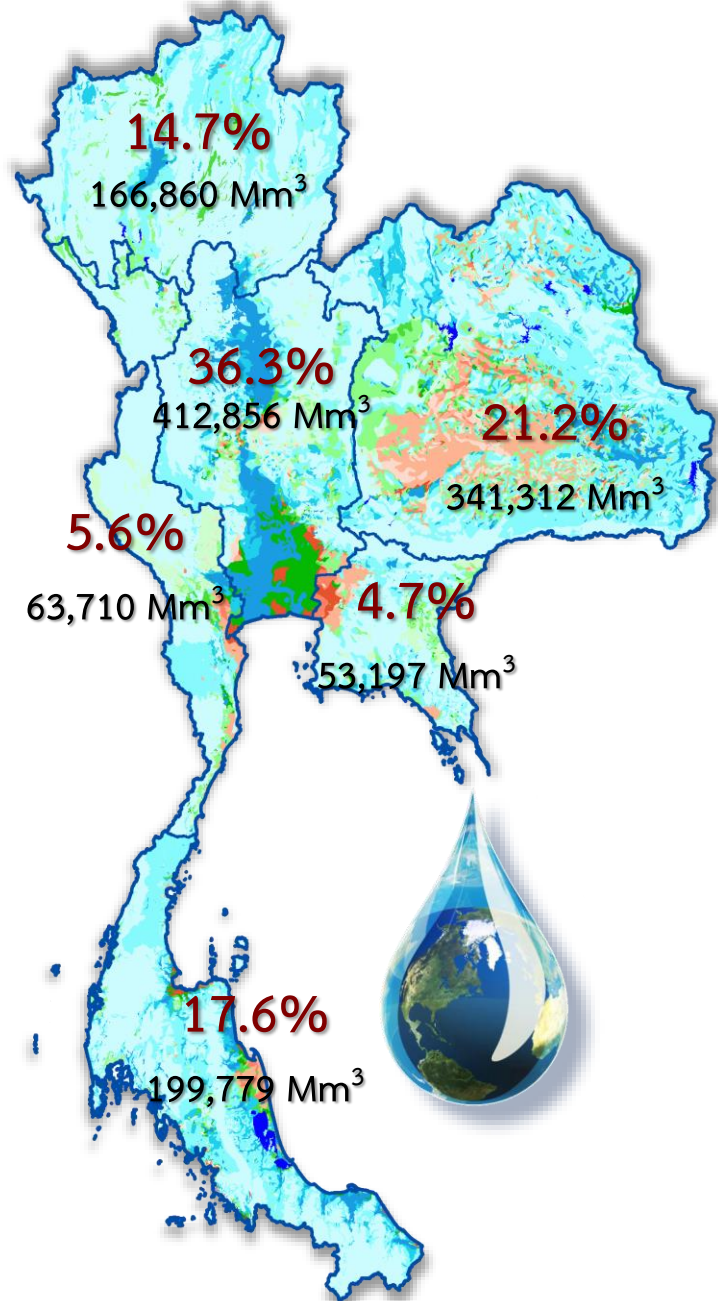


เด็กไทย
Photo by Khunphai









Groundwater in Thailand

Groundwater Storage 1,131,959 Million m³/y

Annual recharge 72,987 Million m³/y

Safe Yield 45,386 Million m³/y

Current Groundwater Use 14,741 Million m³/y

Water availability 30,644 Million m³/y

Water demand management in Thailand

30,000
 Mm^3/years



Option 1



Option 2



History of Groundwater development



Version 1.0
Hand Pump



Version 2.0
Electric Pump



Version 3.0
Electric
+ Solar Cell
Small Size Project

What
About
NOW?
Version 4.0

Ground Water Development

Past



Present



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Challenge in Ground Water Management

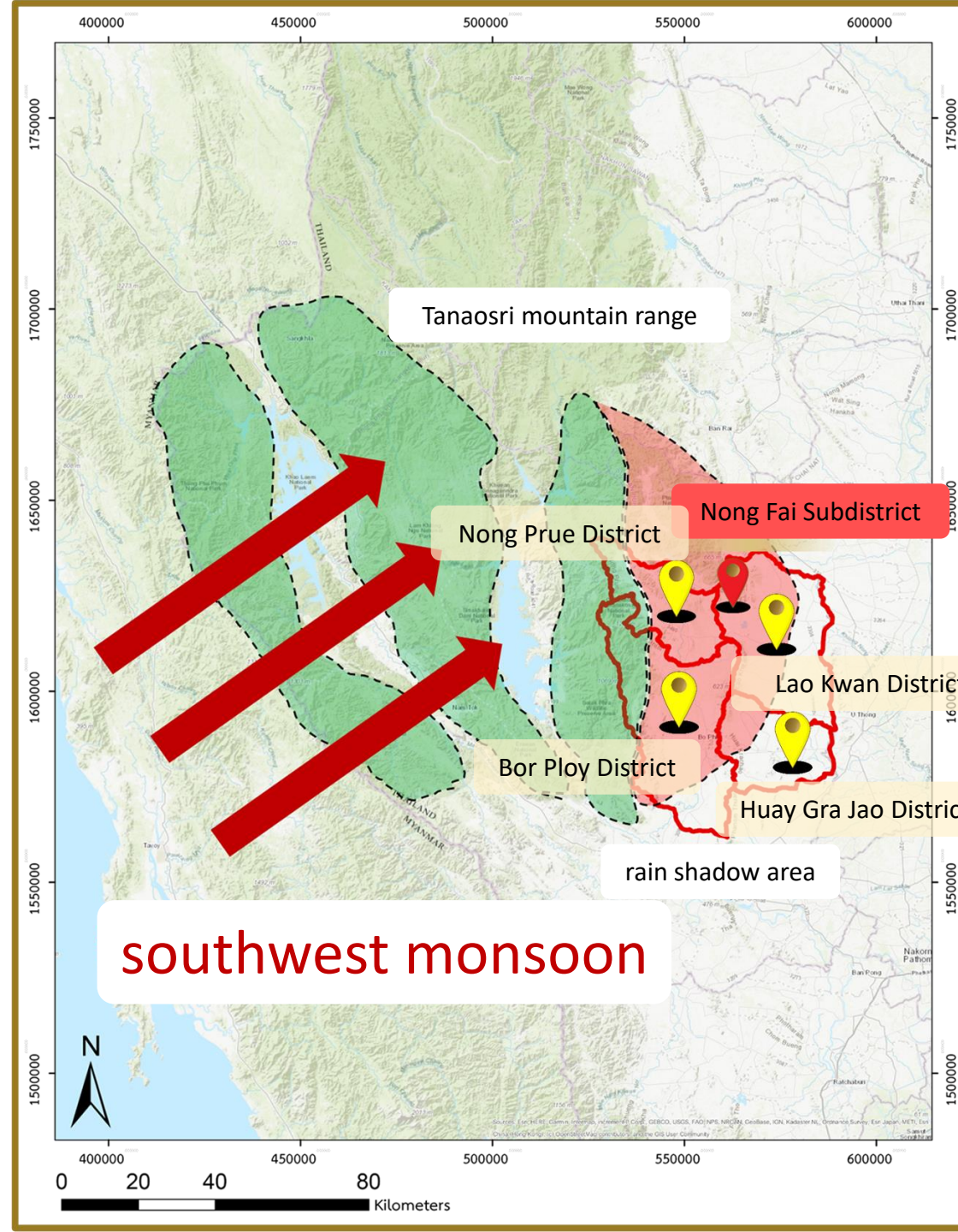
Development



Sustainability

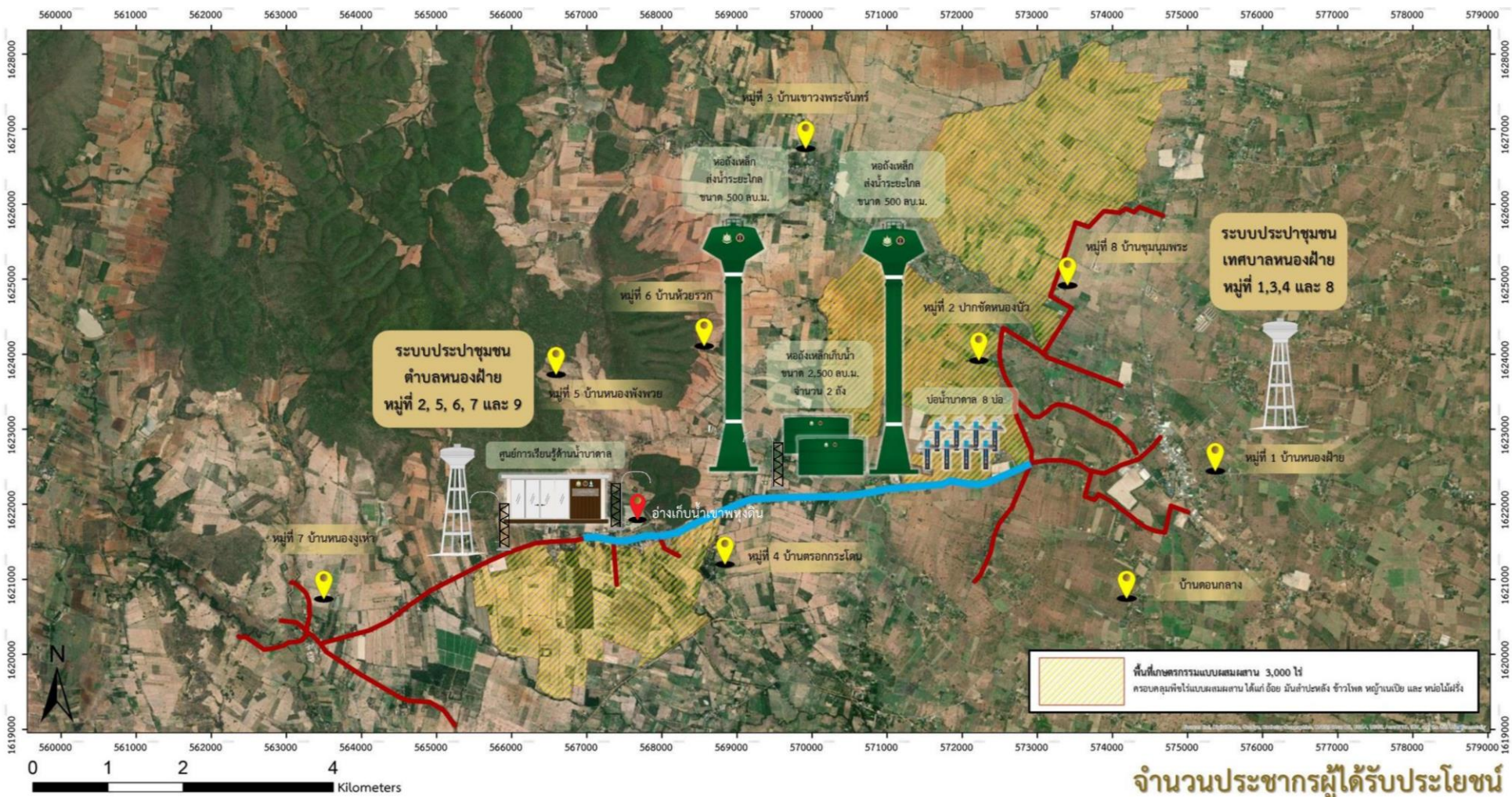
1st Innovation : Mega Groundwater Development Project





Large-Scale Groundwater Supply for Drought Relief

Nong Fai, Lao Khwan, Kanchanaburi



GW yield from 6 wells (m ³ /hr)	Estimated GW yield (m ³ /year)
300	1,752,000

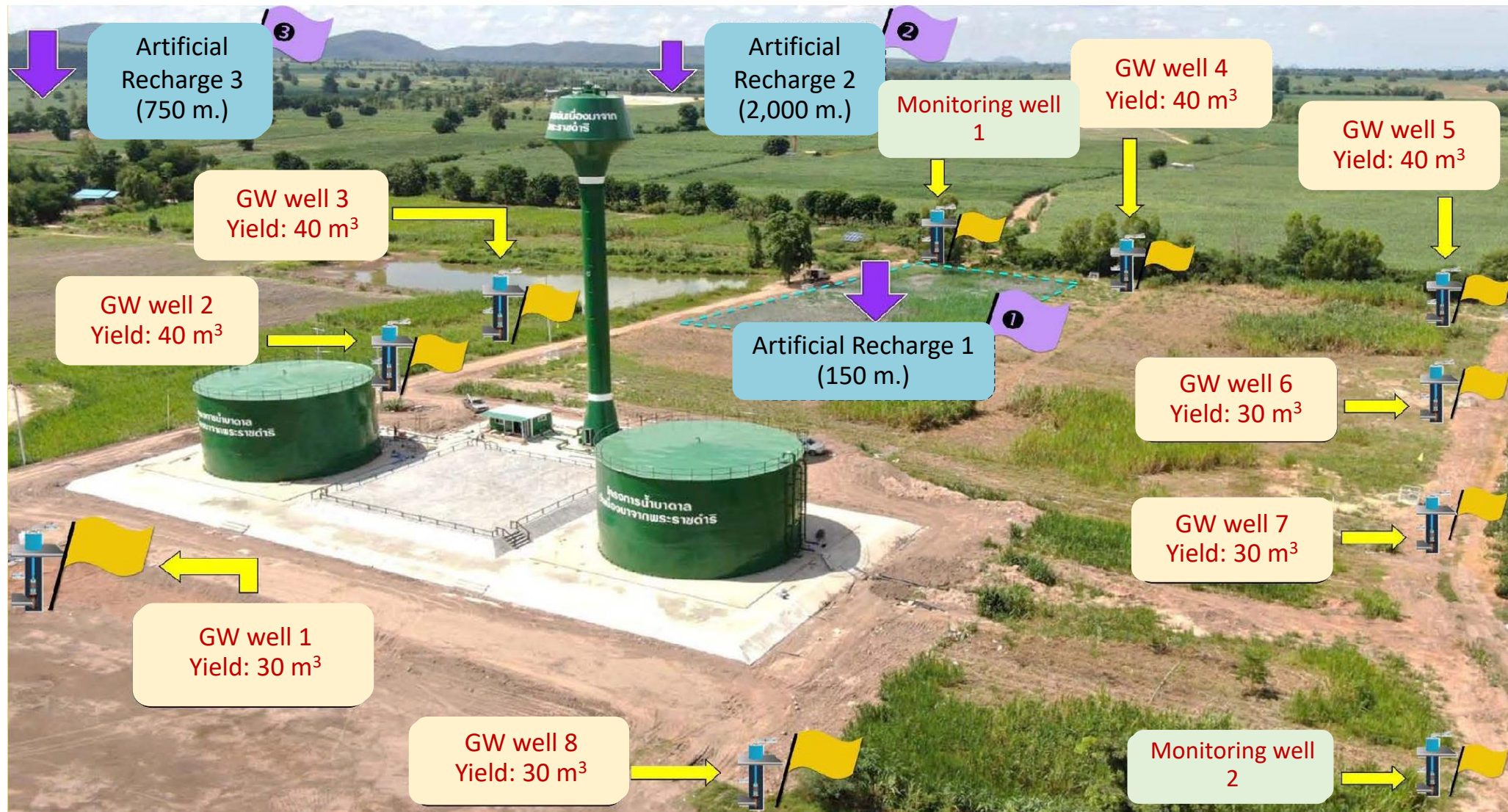
Benefit	
Individuals	5,786
Households	1,856
Agriculture (rai)	3,000

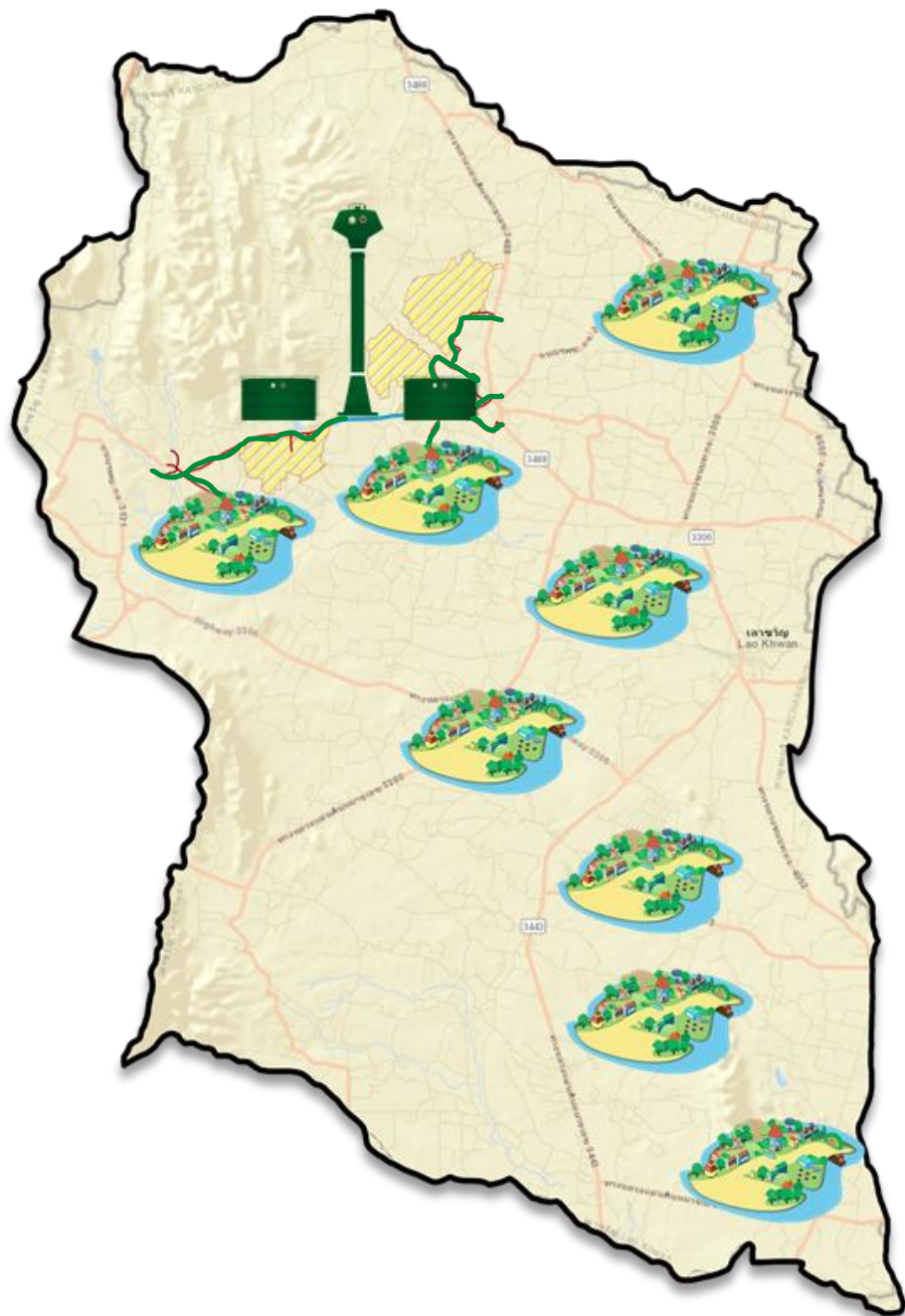
— ท่อระบบประปาเดิม ระยะส่งน้ำ 14,500 เมตร
— ท่อส่งน้ำภายในโครงการ ขนาด 8 นิ้ว ระยะส่งน้ำ 3,800 เมตร

จำนวนประชากรผู้ได้รับประโยชน์
ตำบลหนองผ้าย มีจำนวน 9 หมู่บ้าน พื้นที่เกษตรกรรม 3,000 ไร่
ผู้ที่ได้รับประโยชน์ 5,786 คน หรือ 1,856 ครัวเรือน

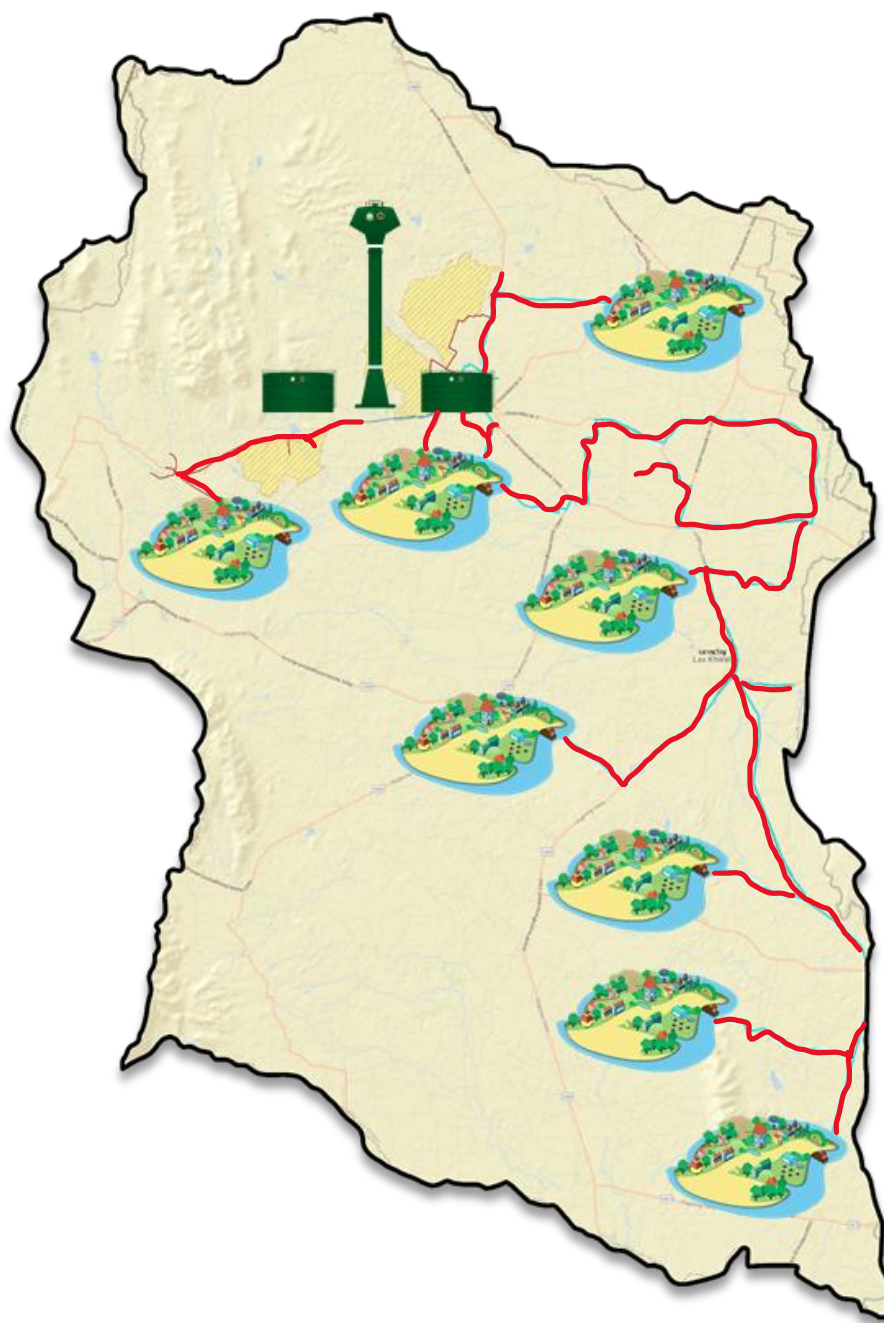
Large-Scale Groundwater Supply for Drought Relief

Nong Fai, Lao Khwan, Kanchanaburi





Benefit > 5,000 people



Benefit > 60,000 people

**Benefitted area
3,000 Rais**

**5,786
beneficiaries
(1,856 households)**



Mineral Water



Quality
=

Huai Krachao Water



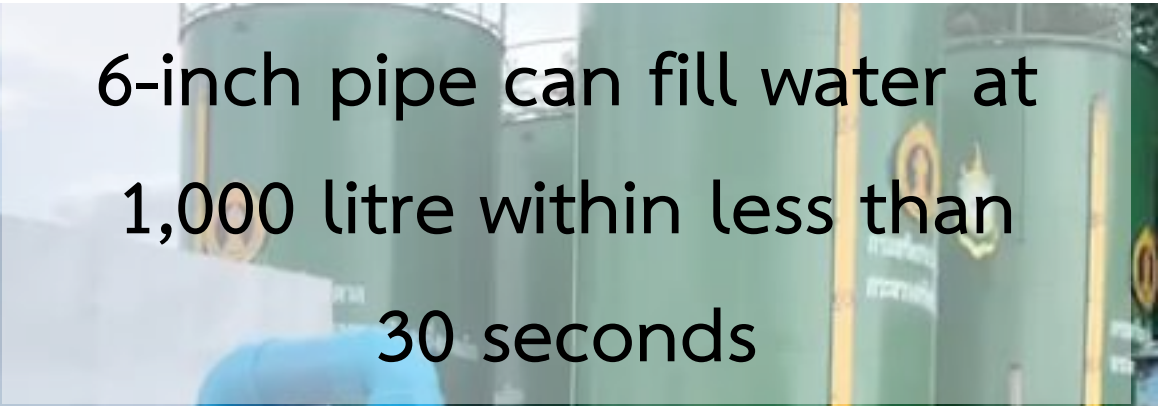


Daily drinking water cost \$0.5 per person
 Monthly drinking water cost \$45 per months
 Yearly drinking water cost \$540k per years
Return on investment 4 years



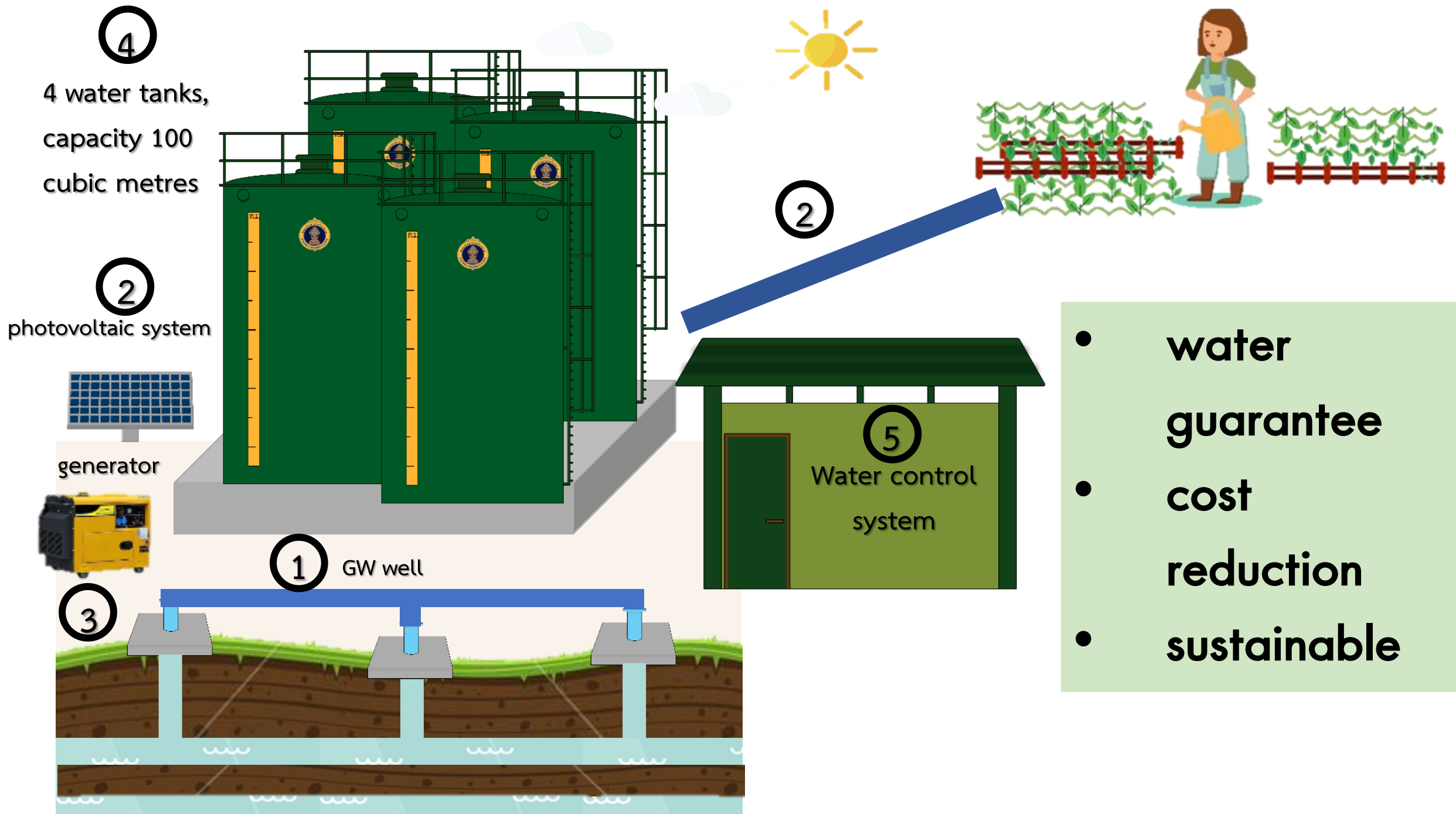


3 water tanks can fully fill
to their capacity of 400,000
litres in 5 hours



6-inch pipe can fill water at
1,000 litre within less than
30 seconds





- **water**
- **guarantee**
- **cost**
- **reduction**
- **sustainable**

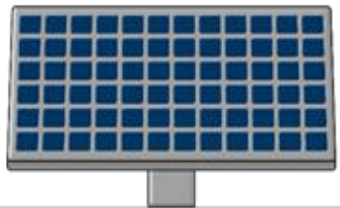
Groundwater for Large Scale Agriculture Project

- water guarantee
- cost reduction
- sustainable

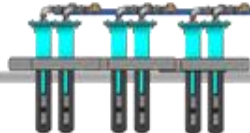
2 water tanks,
capacity 120 m³



Photovoltaic
system



Groundwater
well



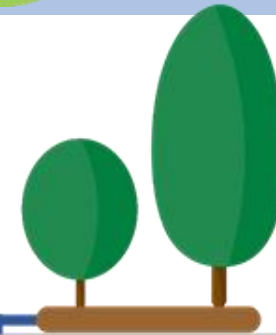
Benefited areas
> 4,000 rais



Benefited farmers
> 400 households



Volume of GW
657,000 cubic meters/year

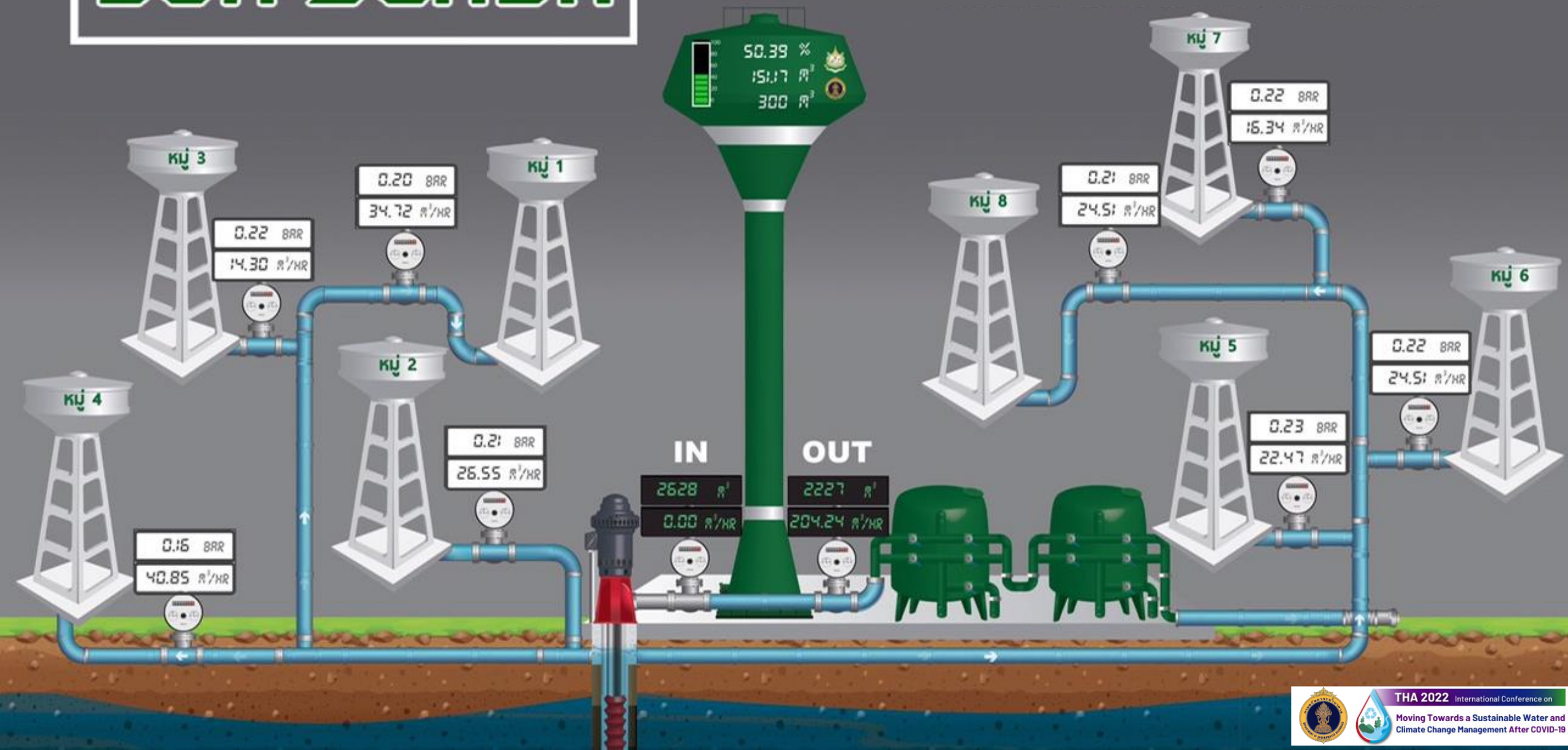


Groundwater for Large Scale Agriculture Project



DGR-SCADA

2nd Innovation

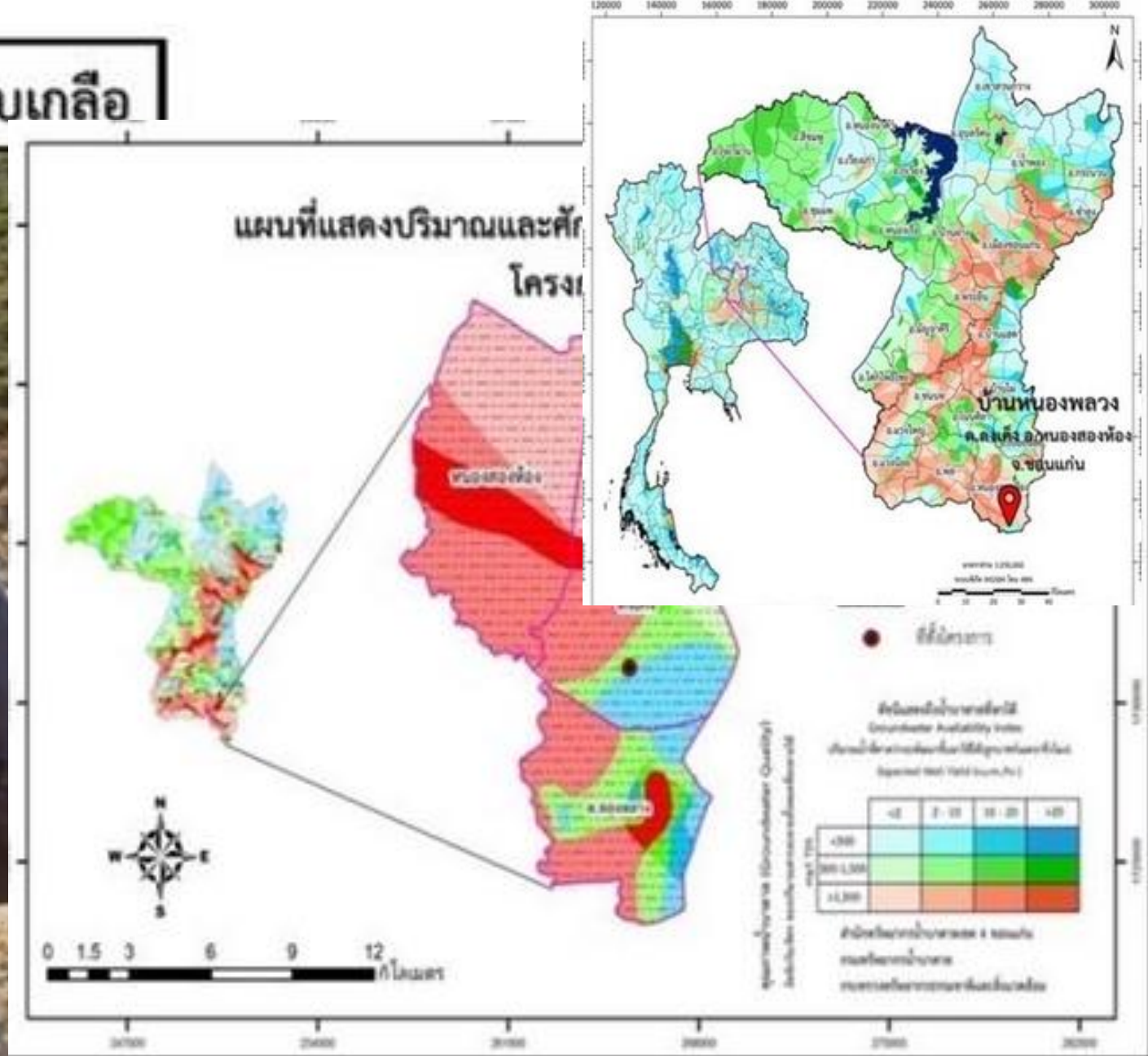








คราบเกลือ



2nd Innovation : DGR SCADA



Website



Application

DGR SCADA : RBF, CHAI NART Province



DGR SCADA : RBF, CHAI NART Province



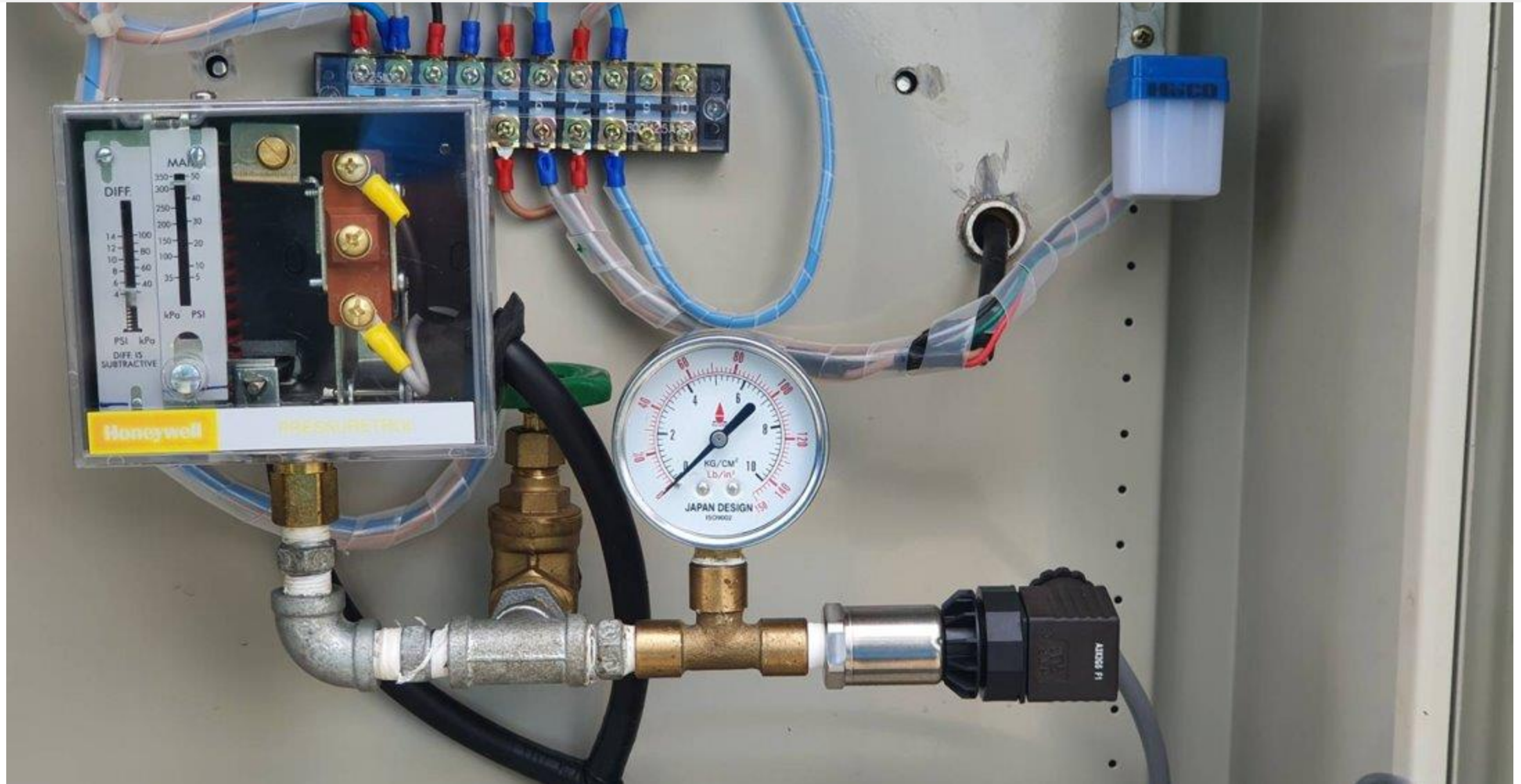
DGR SCADA : RBF, CHAI NART Province



DGR SCADA : RBF, CHAI NART Province



DGR SCADA : RBF, CHAI NART Province



3rd Innovation : Groundwater conservation management

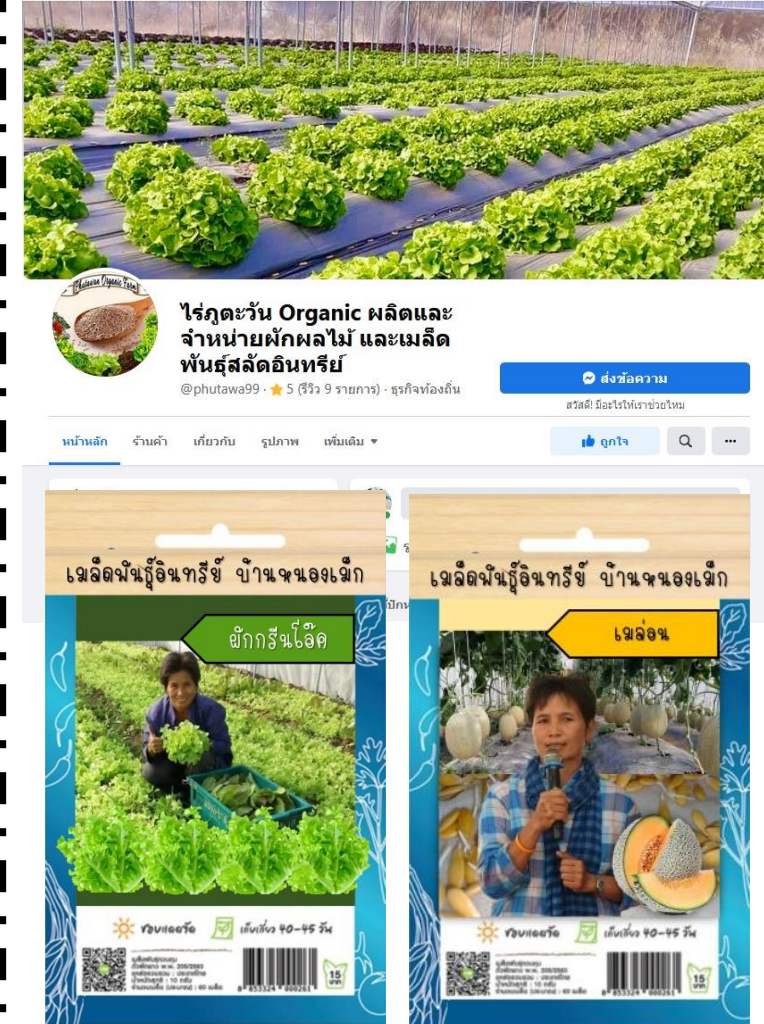
Past



Present



Future



Sustainable Cycles on Groundwater Management

Upstream

Groundwater User



General Info. : water shortage

Crops: Organic Vegetables

Benefitted area: 160 Rais

Income per household: TBH per year

Before : 20,000 – 30,000

After : 100,000 – 400,000

Learning : Healthy agriculture practice and selling seeds



Midstream

Farmer group

- ✓ Setting the farmer group
- ✓ Knowledge enhancement, understanding how to look after the groundwater supply system
- ✓ Knowledge of economical crops
- ✓ Knowledge of business and market mechanism
- ✓ Logistic



Downstream

Sustainability, value, stability

- ✓ Knowledge transfer and delivering the system
- ✓ Setting up the working group
- ✓ Collaboration with the bank, gov. agencies, state enterprise, private sectors
- ✓ Monitoring and assessment



Collaboration with other organizations



Promote public participation in agricultural groundwater management
by working with the **Bank for Agriculture and Agricultural Cooperatives (BAAC)**



1. Promote integrated collaboration for GW management for large scale agriculture
2. Promote GW knowledge and technologies
3. Promote local participation and enhance their income



Supply

1. GW system
2. GW Management
3. GW bank

GW users (793 communities)

Create strong economic foundation

Producers (10 communities)

Supply

1. Knowledge
2. Capital
3. Value Chain
4. Market
5. Machinery pull

Demand

1. After care
2. Water distribution
3. GW users

Demand

1. Communities
2. Participation
3. Capital
4. Accounting
5. Productivity
6. Make added value
7. Market



Water distribution installation

Extend water system



Groundwater Management Manual

Domestic Consumption Manual



Water for Agriculture Manual



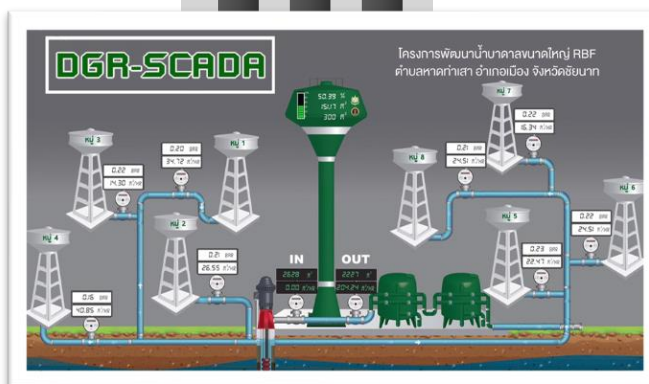
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SDGs 6



1st



2nd



3rd

Sustainable Groundwater Management



Thank you for your attention

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