

IWRA Online Conference – Abstract Submission Review Form
Addressing Groundwater Resilience under Climate Change, 28-30 October 2020

Abstract title: The impact of climate change towards groundwater use and mitigation in The Upper Central Plain Basin of Thailand

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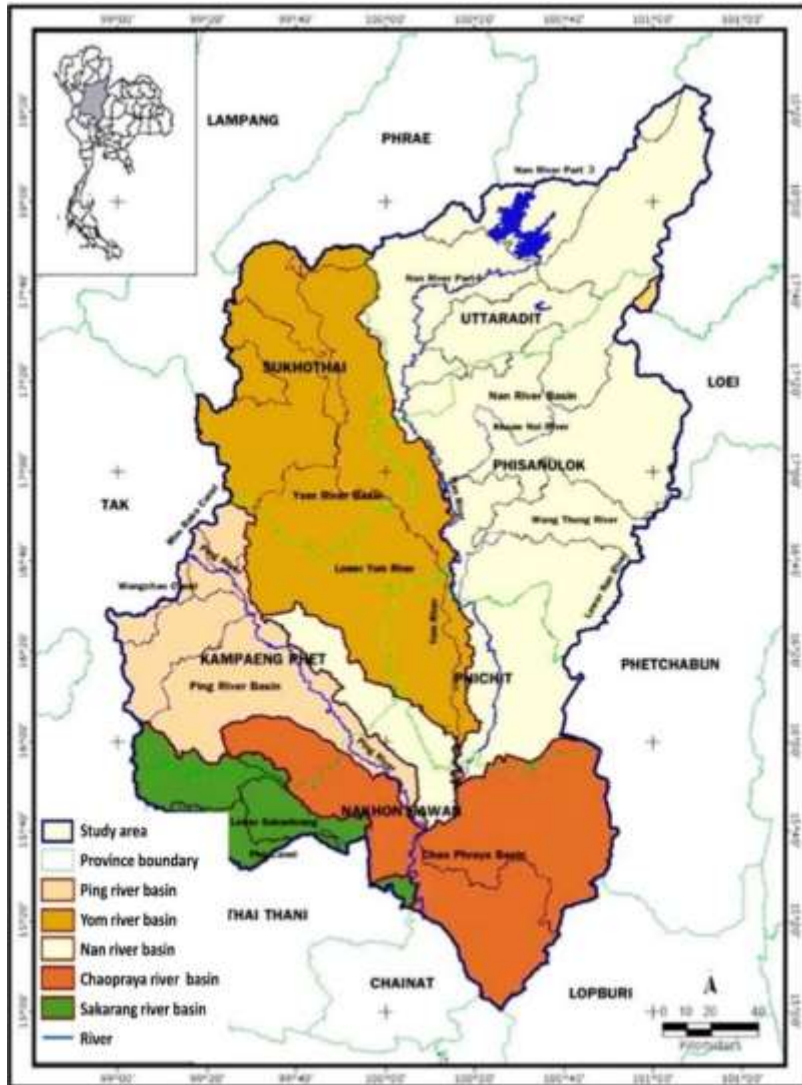
30 October 2020

Content

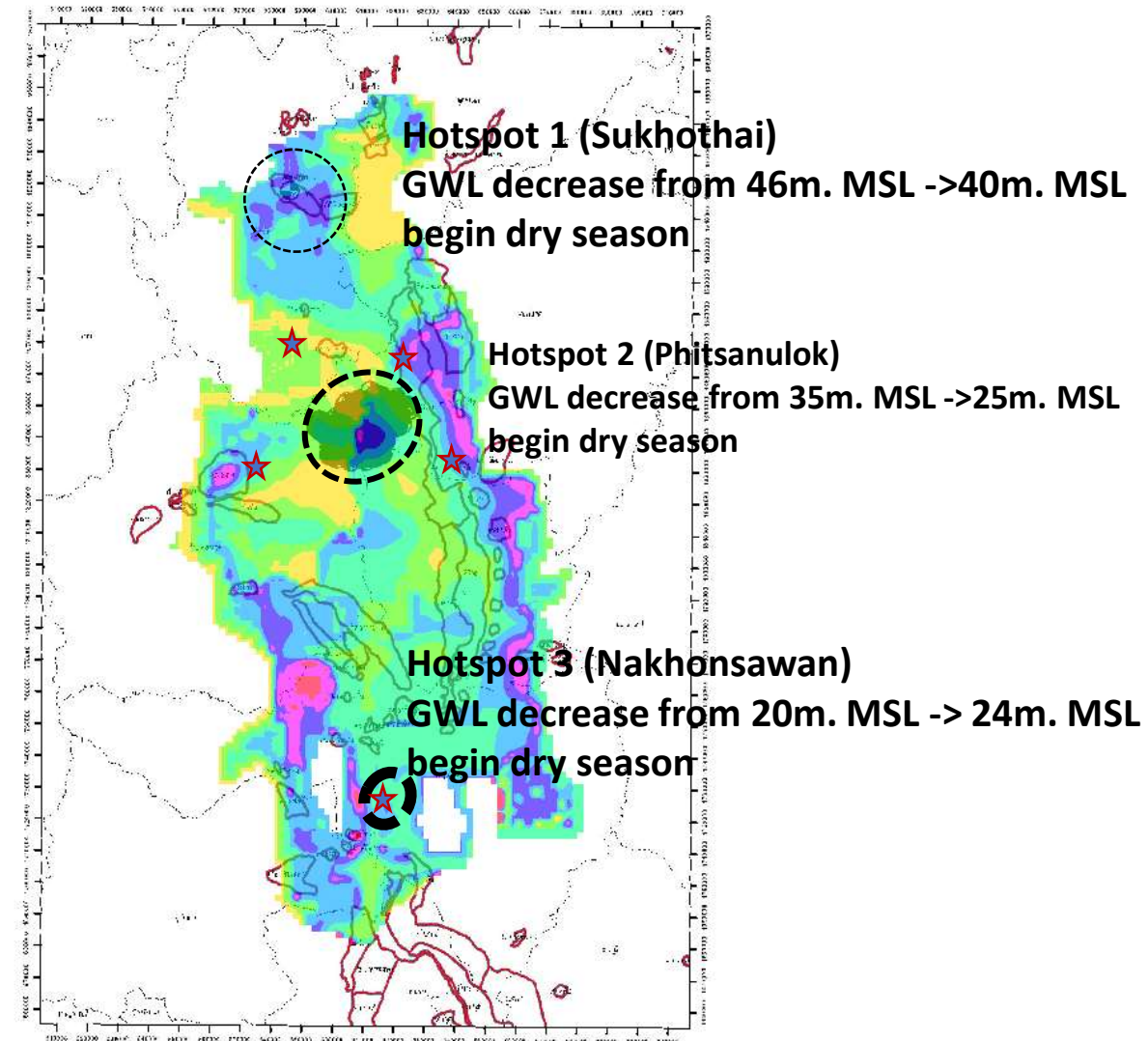
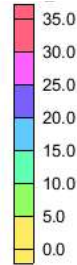
- I. Study area (the Upper Central Plain Basin of Thailand)**
- II. The bias correction rainfall (MRI and IPSL) in the study area**
- III. The impact of climate change towards groundwater levels**
- IV. The mitigation measures through recharge well field**
- V. Conclusions**

I. Study area

The Upper Central Plain Basin of Thailand and hot spot areas



Historical max GWL
below the ground (m)

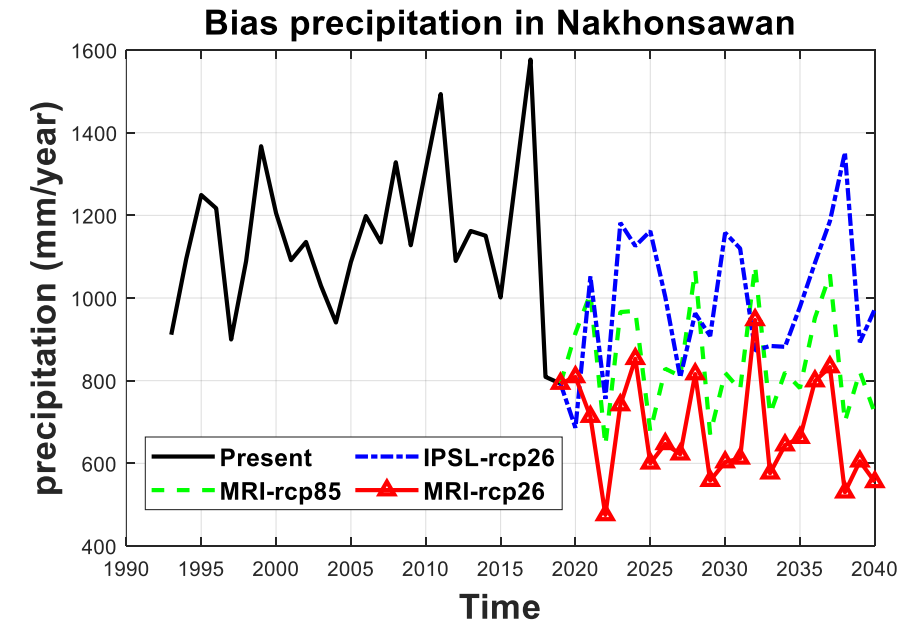
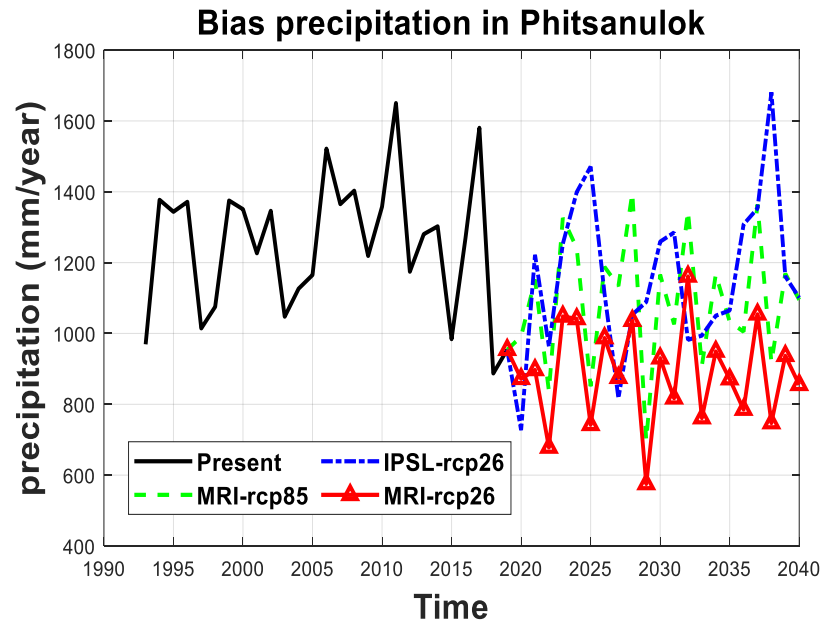
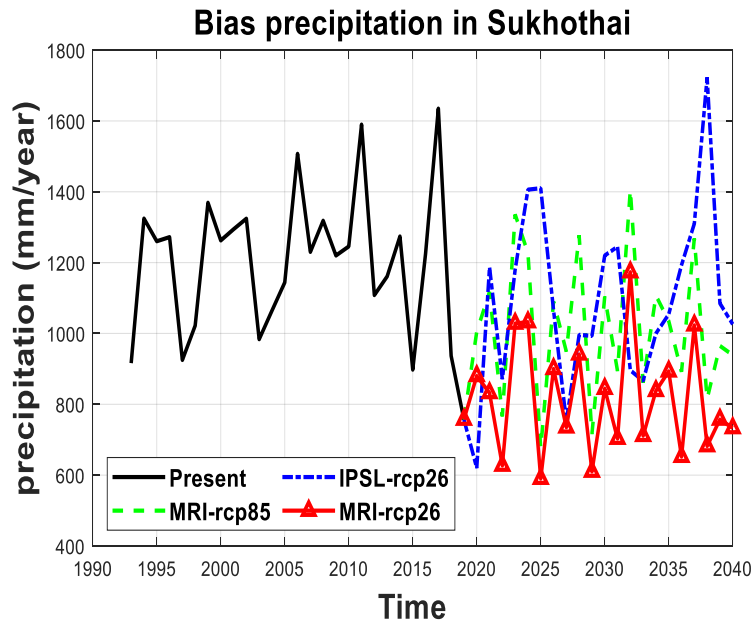


II. The bias correction rainfalls (MRI and IPSL) in the study area

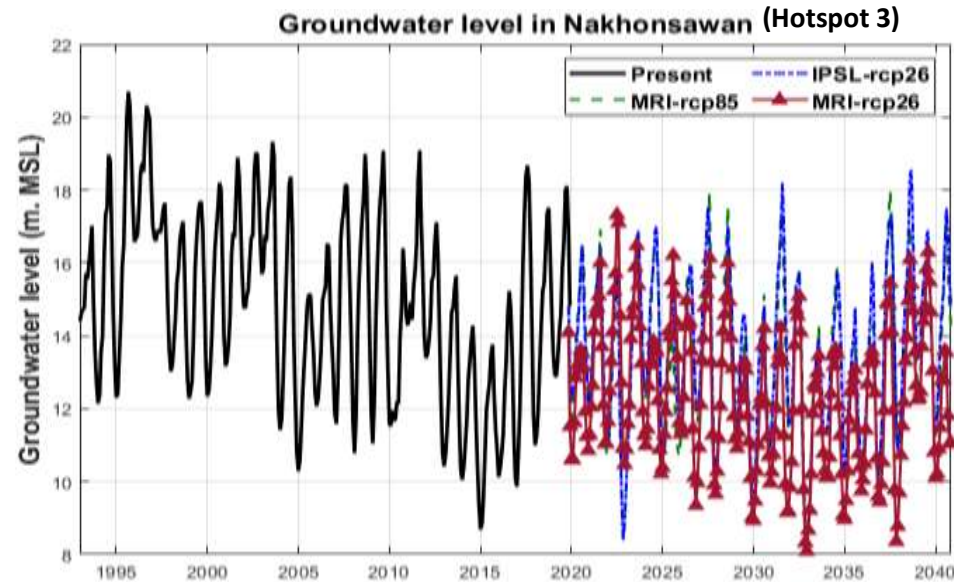
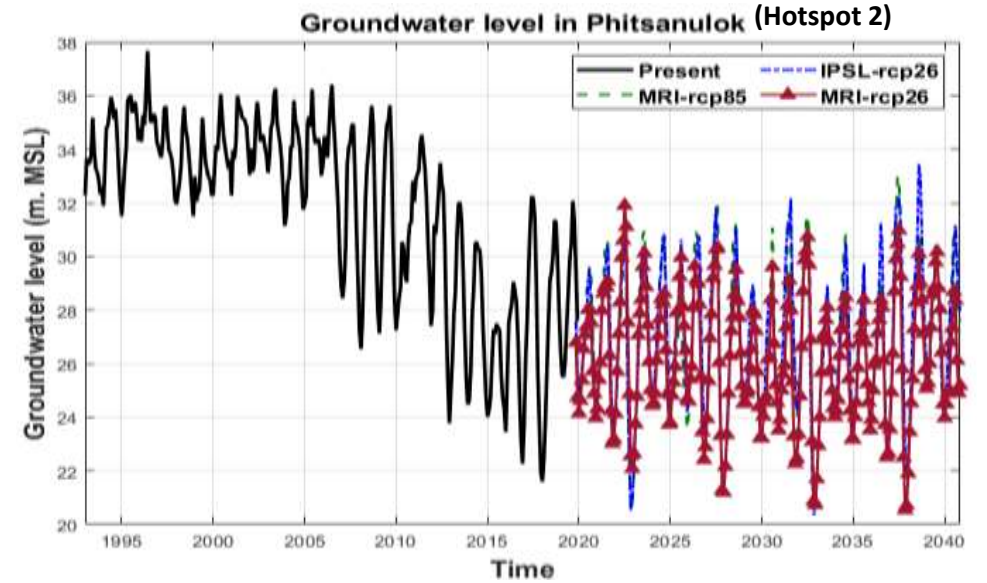
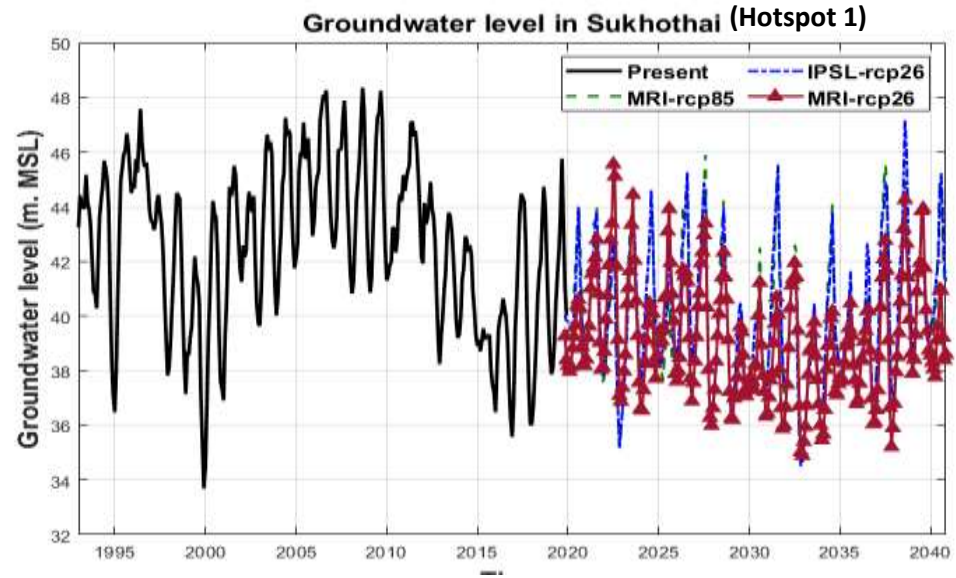
Scenarios	Mean error(mm/year)						
	Utraradit	Sukhothai	Phitsanulok	Kampengphet	Pichit	Average regional	Rank
IPSL-CM5A-MR_rcp26adj_pr	134.48	141.74	-45.92	-22.46	2.3	42	1
IPSL-CM5A-MR_rcp45adj_pr	130.98	160.24	-12.17	-9.46	-2.2	53.5	3
IPSL-CM5A-MR_rcp85adj_pr	102.73	139.49	-18.92	-10.96	19.8	46.4	2
MRI-CGCM3_rcp26adj_pr	-208.27	-214.008	-393.665	-394.958	-336.703	-309.5	6
MRI-CGCM3_rcp45adj_pr	-110.27	-115.008	-298.415	-312.958	-263.953	-220.1	5
MRI-CGCM3_rcp85adj_pr	-6.02	-5.51	-195.42	-212.96	-173.2	-118.6	4

The rainfalls of GCM MRI decrease 10% for whole region in next 20 years

The rainfalls of IPSL increase 10% in upstream (Utraradit , Sukhothai) and decrease 5% in downstream (Phitsanulok, Kampengphet, Phicit) in next 20 years



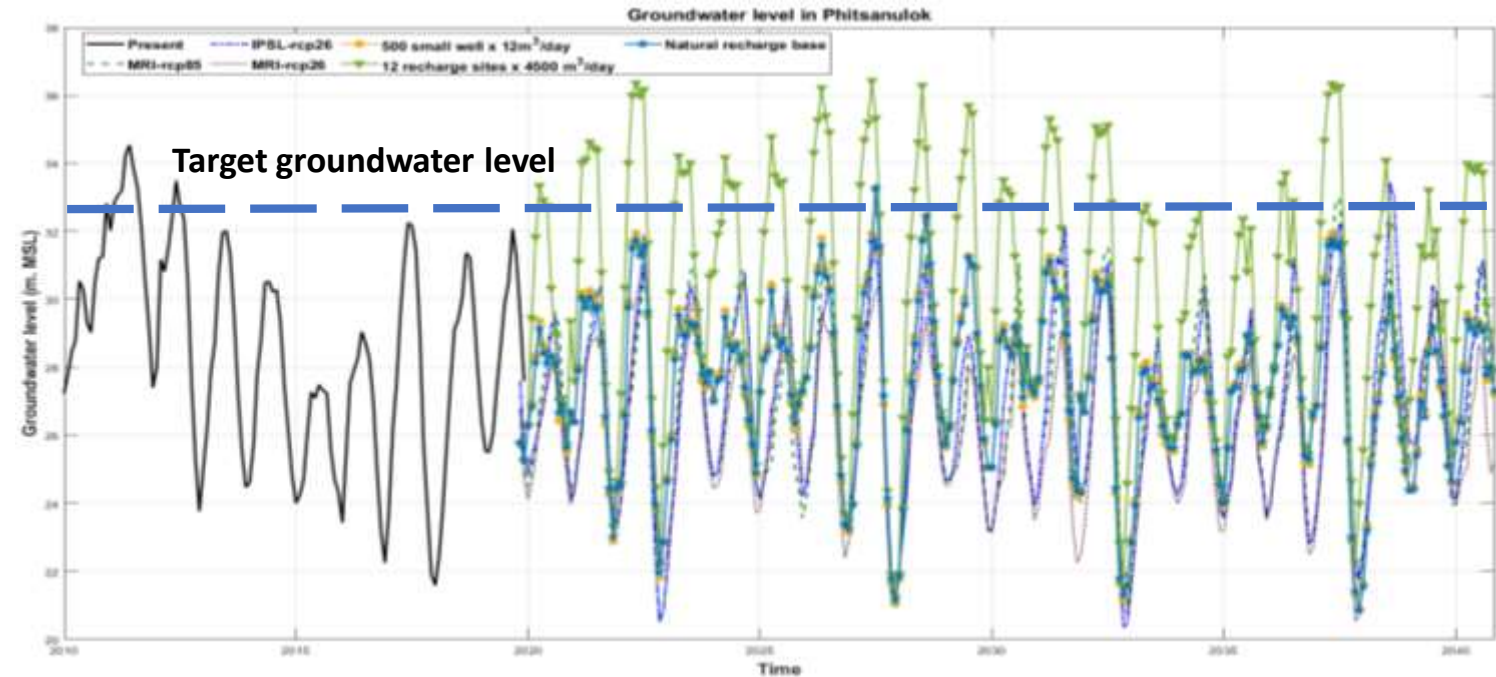
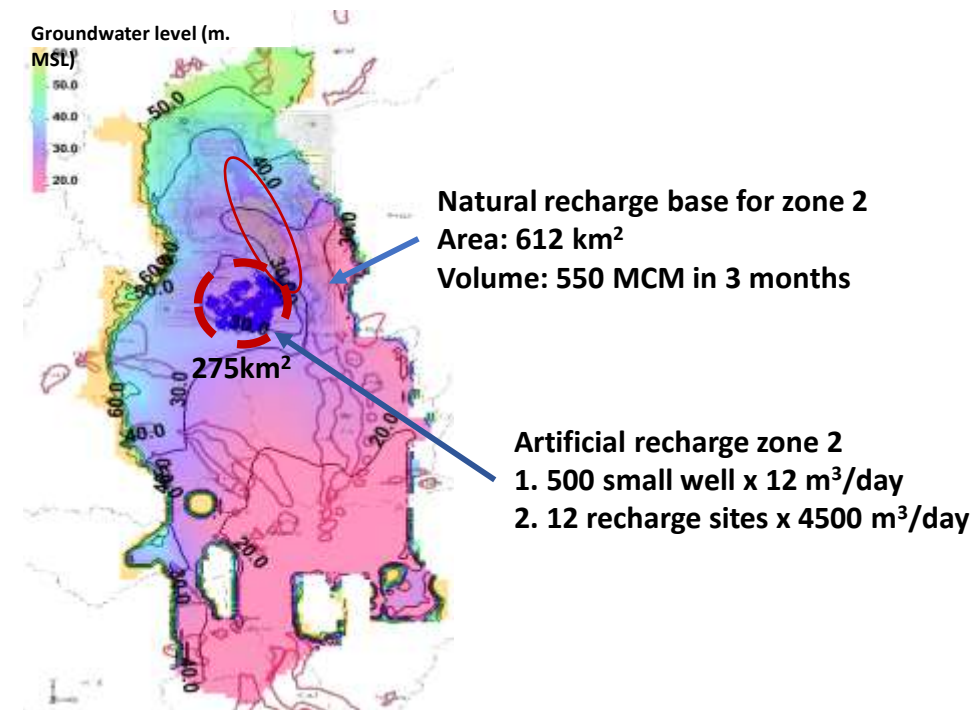
III. The impact of climate change towards groundwater levels



The projected groundwater levels keep going down under recent drought years based on 3 scenarios.

IV. The mitigation measures via recharge well field

Example : mitigation groundwater recharge trial run at hotspot 2 from 2020-2040



- Alternative 1 (inject 500 small wells during wet season)* recover 0.29 m with volume recharge 28.8MCM/ year
- Alternative 2 (natural recharge base in 3 wet months)* recover 0.33 m with volume recharge 15.18MCM/ year
- Alternative 3 (Artificial recharge ponds) recover 4.96 m with volume recharge 12.96MCM/ year

* Existing projects

V. Conclusions

- The rainfalls of GCM MRI decrease 10% for whole region in next 20 years
- The rainfalls of IPSL increase 10% in upstream (Utraradit , Sukhothai) and decrease 5% in down stream (Phitsanulok, Kampengphet, Phicit) in next 20 years
- The groundwater levels tend to decrease in next 20 years in 3 scenarios
- The existing mitigation project are low effective on groundwater recharge since the coverage area are large. The artificial recharge ponds with high volume and focus area (hot spot area 2) can assist groundwater levels increase 0.17-5.0 meters which covered the area of 275 km² from the year 2020-2040.

References

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Thank you for your attention