SDG 6.5.5 Cooperation on water security

Cooperate with local, regional, national, or global governments on water security.

Project 1: Prevention of the Crisis of Insufficient Water Supply

Partner: Central and local government

Item 1 Description

Extreme climate conditions have led to a crisis in Taiwan's water resource supply. In normal circumstances, underground water on construction sites is often not utilized and is discharged using the point well method. In order to effectively utilize underground water resources and maximize their benefits, the YunTech team has proposed a plan for the utilization of point well groundwater resources. This plan involves groundwater replenishment, reduced groundwater extraction, decreased electricity expenditure, increased water supply stability, and the prevention of water resource crises.

This project collects current status and background information on the Taichung Export Processing Zone and explores and analyzes various aspects, including hydrological and geographical background data, regulatory aspects, engineering technology aspects, and socio-economic activities. Subsequently, specific and feasible plans for the reuse of point well groundwater resources at construction sites are proposed. Proposed directions include the use of point well groundwater for surrounding retention or detention basins, the use of point well groundwater in conjunction with a water resource recycling center in the park, and the use of point well groundwater in conjunction with a park's water recycling plant, all aimed at fully utilizing point well groundwater resources and increasing the stability of water supply. This project also includes a trial of one case of point well groundwater resource utilization, proposes a planning scheme for the trial case, implements a demonstration case of point well groundwater resource reuse, evaluates its effectiveness, and consolidates the implementation status of the trial case to provide recommendations for promoting future point well groundwater resource reuse.

Item 1 Evidence/outcome

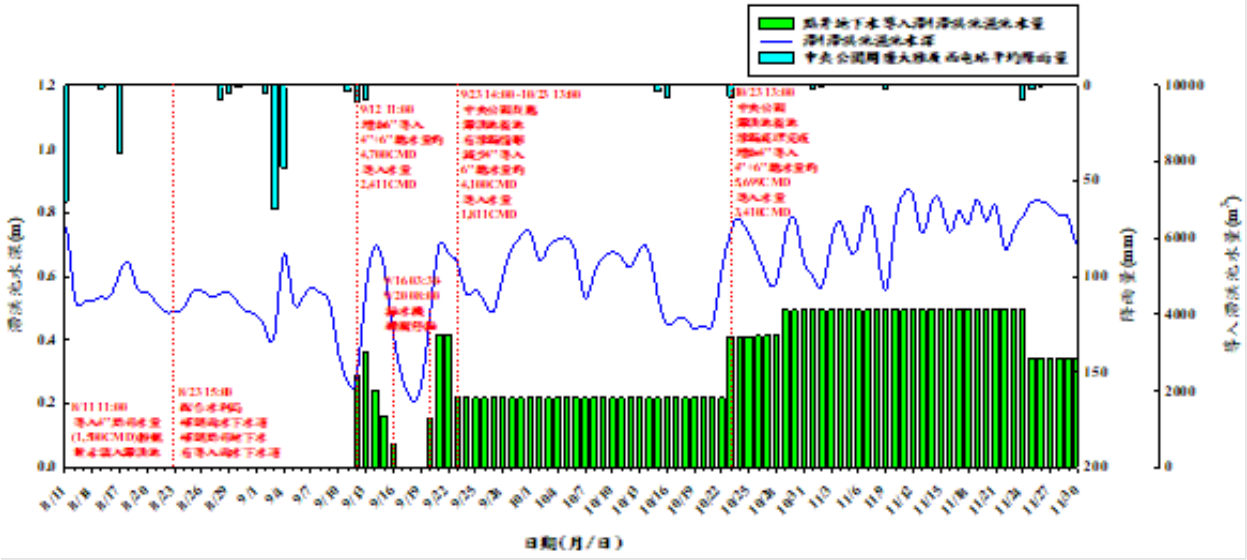
- **Project tasks**

1. Investigation and analysis of background information on point well groundwater resources in the Water Nantou Export Processing Zone in Taichung City.
2. Planning for the utilization of point well groundwater in surrounding retention or detention basins in the park.
3. Planning for the utilization of point well groundwater in conjunction with the park's water resource recycling center.
4. Planning for the utilization of point well groundwater in conjunction with the park's water recycling plant.

5. Trial of one case of point well groundwater resource utilization.
6. Technical consultation and support services, and other assistance as needed.
7. Investigation and analysis of background information on point well groundwater resources in the Water Nantou Export Processing Zone in Taichung City.

- **Achievements:**

1. Planning for the utilization of point well groundwater in surrounding retention or detention basins in the park with 5 feasible options.
2. Planning for the utilization of point well groundwater in conjunction with the park's water resource recycling center with 4 feasible options.
3. Planning for the utilization of point well groundwater in conjunction with the park's water recycling plant with 4 feasible options.
4. Identifying 5 feasible options for using point well groundwater as one of the sources for the tap water supply system.
5. Planning 1 feasible option for utilizing point well groundwater to meet the demands of the Central Taiwan Science Park.
6. Planning 2 feasible options for emergency water supply in response to defense requirements.
7. During the trial period from September 12 to October 5, a total of 24 days, approximately 48,000 metric tons of groundwater were replenished, and around 41,000 metric tons of groundwater were reduced, resulting in an estimated savings of 495 kilowatt-hours of electricity usage.
8. Assistance in drafting (or adjusting and modifying) a total of 12 documents and participation (or involvement) in 20 related meetings and site inspections, providing technical consultation and support services.
9. Potential increase in groundwater replenishment by 0.5 to 19.8 million metric tons per year.
10. Reduction in groundwater extraction by 730,000 metric tons per year.
11. Reduction in electricity expenditure by NT$43,000 per year.
12. Reduction in tap water usage fees by NT$6.51 million per year.
13. Provision of high-tech industry water production value for the Central Taiwan Science Park, estimated at NT$10.49 million to NT$23.75 million per year.



Results of Water Level Observation in Central Park's 4 Retention Basins (During the Trial Period)

Project 2. Water security plan in partnership with YunTech

Item 1 Description

Partner: Global governments

Link: https://tvepoc.yuntech.edu.tw/en/about.html

The Taiwan-Vietnam Environmental Protection Overseas Research Center was jointly established by YunTech and the National University of Vietnam, Ho Chi Minh City University of Science, hoping to jointly improve environmental protection technology, promote environmental protection efficiency and cultivate professional talents. Through the maintenance of this plan, the interactive exchanges between the teachers and students of the two schools will be increased to promote the cooperation of talent cultivation and research and development of forward-looking environmental protection technology, and promote the sustainable development and cooperation exchanges with Vietnam.

The implementation strategy of the Taiwan-Vietnam Environmental Protection Overseas Research Center is as follows:

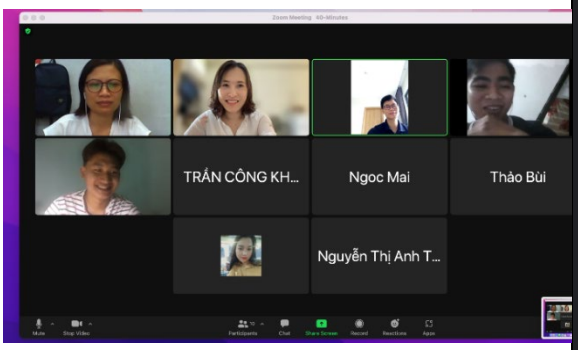
1. Taking "environmental protection technology" as the main axis of research and development
2. Based on environmental protection technologies such as "water, soil, air and chemical substances", develop "smart environmental protection"
3. Combining with Taiwan's promotion of environmental protection technology export, conducting personnel training, professional exchanges, and investigation and research on important environmental issues, etc.
4. Match the Taiwanese technical team, through academic cooperation and professional technology output

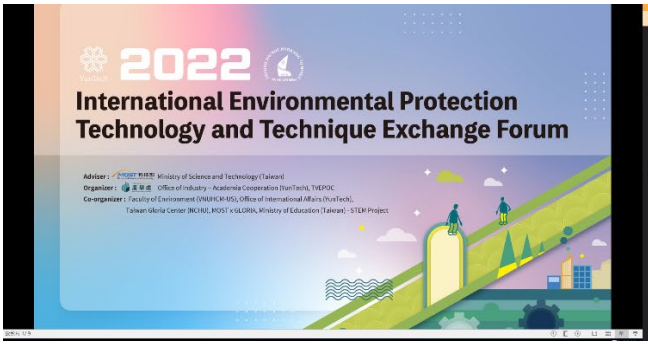
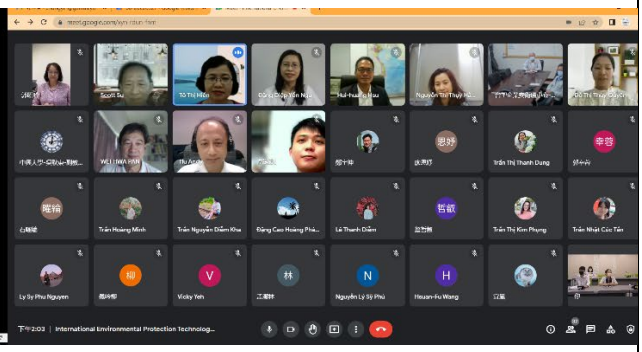
5. Through cooperation and guidance opportunities, accumulate the Taiwanese research team's application ability in environmental protection technology

Item 2 Evidence/outcome

[臺越環境保護海外科研中心 (yuntech.edu.tw)]

Cooperation records with Vietnam National University Ho Chi Minh City - University of Science (VNUHCM-US)	
	
Ph.D and Master students from prof. Kuo, Chao-Yin research team had a discussion	Prof. Shih Dong-Her and prof. Nguyen Ly Sy Phu conducted research cooperation. Students from both

with Dr. To Thi Hien on line.	laboratories also communicated with each other and introduced their respective research projects.
	
In 2022, Dr. Nguyen Thanh Tam was in the laboratory of YunTech for research and exchanges, and regularly communicated with Vietnamese students, provided cross-border guidance to share cross-border research experience.	Students from Taiwan and Vietnam shared about research topics.
	
TVEPOC 2022 International Environmental Protection Technology and	TVEPOC 2022 International Environmental Protection Technology and Technique Exchange

Technique Exchange Forum poster	Forum Agenda
	
TVEPOC 2022 International Environmental Protection Technology and Technique Exchange Forum Photo	

Item 2 Description

Issues: Groundwater monitoring, Groundwater Resources Management, Environmental Education Promotion and Development, Hydrological environment monitoring, Farmland Water Conservancy, Water Well Management

Partner: National & Regional& local

Every year, YunTech collaborates with government agencies to implement many water security related projects.

Item 2 Evidence/outcome

Cooperated institution	Project title
Environmental Protection Bureau, Nantou County Government	2022 Annual Nantou County soil and groundwater monitoring research work plan
Yunlin County Government	Yunlin County Groundwater Resources Management and Groundwater Situation System Development Plan
Ministry of Economic Affairs, Water Resources Agency	2022 Annual Groundwater Observation Network Operation and Groundwater Conservation Plan
Ministry of Economic Affairs, Water Resources Agency	Utilization of groundwater resources in point wells in Taichung Economic and Trade Park
Ministry of Economic Affairs, Water Resources Agency, Central Region Water Resources Office	2022 Annual Hushan Reservoir Environmental Education Promotion and Development Plan

Cooperated institution	Project title
Ministry of Economic Affairs, Water Resources Agency, Central Region Water Resources Office	Hydrological environment monitoring in the downstream section of Tongtou Barrage and evaluation of groundwater conservation benefits of Hushan Reservoir operation (3/3)
Ministry of Economic Affairs, Water Resources Agency, Central Region Water Resources Office	2022 annual water source conservation community promotion plan (water source area upstream of Niaozuitan Hydraulic Lake)
Ministry of Economic Affairs, Water Resources Agency, Fifth River Management Office	Dapi Pumping Station Environmental Education Facilities Certification Guidance (2/2)
Council of Agriculture, Taiwan, Yunlin Irrigation Management	2022 Annual Farmland Water Conservancy Environmental Education Park Environmental Education Facilities Certification Extension
Council of Agriculture, Rural Development and Soil and Water Conservation	2022 Annual Innovation Research Plan - Research on data management methods for soil and water conservation facility inspection history based on artificial intelligence technology
Changhua County Government	2022 Changhua County Water Well Disposal Implementation Plan