



MOST GASE Featured Laboratories-Environmental Fate Studies Lab

<u>科技部 全球事務與科學發展中心亮點實驗室</u> <u>環境宿命與管理實驗室</u>

> Prof. Ming-Chien Su, Department of Natural Resources and Environmental Studies College of Environmental Studies National Dong Hwa University Taiwan 2021





Introduction of the Environmental Fate Studies Lab

Lab Research Interests

- Environmental Fate (measuring, monitoring, impact assessment, risk assessment).(環境宿命:監測、評估、風險管理)
- Environmental Management. (LCA, CSR, SDGs)
- Environmental policy. (Resources Efficiency and Circular Economy, Waste Management, Nitrogen Management)

•Pananadengan:先好好坐下談人之島永續發展目標

•Developing an Agricultural Nitrogen Footprint Model and Nitrogen Policy for Climate Change Adaptation in Taiwan. (氣候調適之氮足 跡與農業氦政策)

The Life Cycle Assessment for approaching circular economy and resource efficiency (以生命週期評估運用於資源循環與循環經濟)
Establishing a ecological risk assessment model for Persistent Toxic Substances (PTS) and Risk Management (持久性污染物之健康風險 與生態風險評估)

•Social-Eco System Resilience: Developing a Regional Water Resilience Capacity Index on Water Governance (發展水韌性評估指標應用於 水治理) 2

Research Focus





Current Projects and Student Exchange Program

MOST project: Collaboration with Hokkaido University & Virginia State University

NDHU Joint Research: with 7 Faculty

> Student Exchange Program

- Developing an Agricultural Nitrogen Footprint Model and Nitrogen Policy for Climate Change Adaptation in Taiwan.
- SDGs: Circular economy and resource efficiency
- Pananadengan:先好好坐下談人之島永 續發展目標Pananadengan:Well-living, Well-being, and the Sustainable Development Goals for Pongso No Tao
 - •Faculty of Agricultural and Environmental Sciences, University of Rostock, Germany.
- The Field Science Center for Northern Biosphere, and Graduate School of Environmental Sceince Hokkaido University, Japan





Environmental Quality Monitoring Air & Water







Environmental Monitoring-Soil and Sediments Sampler







Environmental Monitoring-GHG emission Monitoring







Developing an Agricultural Nitrogen Footprint Model and Nitrogen Label for Climate Change Adaptation in Taiwan The research is designed as

- an empirical study the nitrous oxide (N₂O) emission of rice paddies
- developing a specific Taiwan nitrogen footprint model for the future climate change adaptation to reduce the interference with the nitrogen cycle.



Paddy Rice Growth Stages with the Nitrogen Input





Nitrogen cycle in the organic rice paddy farm in the Ce-Tai Creek of Rosan area

- Developing a nitrogen mass balance model in the Ce-Tai Creek of Rosan area.
- Environmental impacts assessment of organic paddy farm.
- Monitoring the heavy metals and nitrogen distribution in the water and soil of organic rice paddy farm and the surrounding area.









Developing Guidance of Pollution Prevention and circular economy for Livestock Industry

- Updating the basic information of livestock farms in Eastern Taiwan.
- Feasibility study of wastewater treatment Technology for livestock industry.
- Manure Management within renewable energy recovery and material recycling to approaching circular economy and resource efficiency







Establishing the Ecological Risk Assessment Model for Persistent Toxic Substances (PTS) in Taroko National Park

- Environmental Fate and Transportation of PTS in Taroko National Park.
- Establishing the PTSdatabase for Taroko National Park.
- Establishing an Ecological Risk Assessment Model for PTS.











環境宿命研究污染物長程傳輸 Environmental Fate Studies Long-Range Pollutants Transportation





環境宿命農地土壤污染 Environmental Fate Studies Soil Contaminations (PAHs, Heavy metals, Nutrients...)







環境風險評估與管理研究 Environmental Risk Assessment and Management







Marine Ecological Risk Assessment and Management in Hoping Harbor

- Persistent Pollutants Distribution in costal areas of seawater, sediments and shellfish, including:
 - Polycyclic Aromatic Hydrocarbons (PAHs).
 - Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX).
 - Heavy Metals.
- Marine Ecological Risk Assessment.
- Preliminary environmental management plan for Hoping Harbor.







Metals Analysis



Sample Preparation Freeze Dry



AA graphite furnace

Microwave Digestion





Thank You for your Kind Attention! your questions & comments are always welcome

Contact: Ming-Chien Su <u>mcsu@gms.ndhu.edu.tw</u> 科技部 全球事務與科學發展中心亮點實驗室 環境宿命與管理實驗室 https://gase.most.ntu.edu.tw/articles/72 https://www.youtube.com/watch?v=2MR9CeLu7f4