

Education

- Ph.D. **National Taiwan University**, Taipei, Taiwan (2016-2022)
International Doctoral Degree Program in Climate Change and Sustainable Development
Dissertation: *Investigating Role of Field Management on Energy Budgets and Soil Moisture in Tea Fields*
Advisor: Dr. Jehn-Yih Juang
- Master **National Taiwan University**, Taipei, Taiwan (2009-2012)
Institute of Anatomy and Cell Biology
Theses: *Neuropathologic Study of Amyloid Neuropathy*
Advisor: Dr. Sung-Tsang Hsieh
- Bachelor **Tunghai University**, Taichung, Taiwan (2005-2009)
Department of Chemistry
Thesis: *The Protective Effect of Carnosic Acid on PC12 Cell*
Advisor: Dr. Kee-Ching Jeng (Taichung Veterans General Hospital)

Research Experience

- PostDoc Researcher (2023-now)
Research Center for Environmental Changes, Academia Sinica
Greenhouse gas measurements, calculation, and data qualification
- PostDoc Researcher (2022-2023)
Department of Geography, National Taiwan University
Heat stress estimation for workers in tea field
- Research Assistant (2014-2016)
Department of Geography, National Taiwan University
Environmental toxicology of freshwater planarian

Research Interests

Agricultural land-use change, Vegetation and surface energy budget, Sustainable agriculture, Health and disease

Relevant Skills

GIS
Micrometeorology (Eddy-covariance system, Weather station)

Interests and Activities

Jogging
Academic advisor and promote volunteer of climate change at *The Society of Wilderness* (2018)
Student representative at *National Taiwan University Student Congress* (2018)

Honors

1. Springer Theses, Recognizing Outstanding Ph.D. Research, Springer (2023)
2. Dean's Award, College of Science, National Taiwan University (2022)
3. Outstanding Student Paper Award of Earth Science Research Promotion Center in 2018 AGU Fall Meeting, Ministry of Science and Technology, Taiwan (2018)

Publications (Journal Articles)

1. Wang, S.-H., & Juang, J.-Y.* (2024). Different management strategies exert distinct influences on microclimate of soil and canopy in tea fields through surface-atmosphere interactions. *Agricultural Water Management*, 291, 108617. doi:10.1016/j.agwat.2023.108617
2. Wang, S.-H., & Juang, J.-Y.* (2022). Quantifying the influence of management strategies on surface radiation budgets and energy patterns in tea fields. *Environmental Research Letters*, 17(3), 034041. doi:10.1088/1748-9326/ac4361

Publications (Conference Papers)

1. Wang, S.-H.* and Juang, J.-Y. (2022). Comparing the Characteristics on Soil-Atmosphere Interaction Between Two Tea Fields Managed by Different Strategies. *American Geophysical*

Union Fall Meeting.

2. Wang, S.-H.* and Juang, J.-Y. (2021). Organic Tea Field Preserves More Latent Heat Flux but Loss More Soil Moisture in Hilly Terrain. *American Geophysical Union Fall Meeting.*
3. Wang, S.-H.* and Juang, J.-Y. (2020). Quantifying Influence of Management Strategies and Field Practices on Surface Radiation Budget and Energy Patterns in Tea Fields. *Climate Hotspots in Action Forum.*
4. Wang, S.-H.* and Juang, J.-Y. (2019). Comparing Energy Budget Patterns Under Different Weather Conditions and Different Management Strategies in Tea Field. *AsiaFlux Conference.*
5. Wang, S.-H.* and Juang, J.-Y. (2018). Quantify Energy Budget Under Different Canopy Structure in Various Management Strategies in Tea Fields. *American Geophysical Union Fall Meeting.*
6. Wang, S.-H.* and Juang, J.-Y. (2018). Investigating Interactions Between Atmosphere and Vegetation Under Different Patterns of Management of Tea Field. *European Geosciences Union General Assembly.*

Biography

Eddy-covariance (EC) method is helpful in measuring the microclimate; however, it is seldom used in small fetches, such as the piecemeal farmland in Taiwan. Besides, how the land-use type affects the energy budget is critical to the policy-making for future climate scenarios; however, how the different management methods in farmland affect the microclimate is rarely discussed. My dissertation used two sets of EC equipment to measure and analyze the difference in microclimate parameters between two tea fields within different management strategies. The outlines and brief introductions are listed:

1. The fields

The fields in my dissertation (Wang, 2022) are the private tea fields in Pinglin in northern Taiwan. Two tea fields are close, but the farmers use different methods to manage their fields for their own demands. For example, the farmer of the organic-certified field weeding and harvesting by hand, and the farmer of the conventional field uses herbicide to weed and machine to harvest. The methods used in each field modify the canopy structure and soil surface and cause different microclimates distinctively.

2. Establish the measurements

The eddy-covariance measurement equipment and the soil sensors (temperature, water content, and heat flux) were set up to collect the data. Many measurement practices have been trying from 2018 to 2020. Initially, the equipment's power supply relied on frequent battery replacement. After the pre-test in one season, the author negotiated with the farmer to borrow the utility power to support this measurement. After the negotiation and construction, the measurement data became more stable. Still, frequently cleaning the equipment (e.g., the radiometer and open-path gas analyzer) is required to ensure the data quality.

3. The results

The tea tree canopy coverage established by the farmers changes the energy partition and the patterns of soil temperature and moisture. In the organic-

certified field, the farmer keeps the larger canopy for more harvest because of the higher price of hand-pick-up organic tea. Moreover, the conventional field canopy is shorter, making it more convenient to harvest by machine.

3.1 The result of energy partition coming from these fields is that more latent heat flux and less sensible heat flux had been measured in the organic-certified field.

3.2 Besides above ground, the diurnal soil temperature range is higher, and the daily loss rate of soil water content is lower in the conventional field. The daily loss rate of soil water content responds to more latent heat flux in organic-certified fields.

The results of energy partition were published in *Environmental Research Letters* (Wang & Juang, 2022), and the results of soil measurement were published in *Agricultural Water Management* (Wang & Juang, 2024).

I'm interested in how the land surface modified by humans influences the microclimate and energy partition, primarily focusing on agricultural planting. The farmers' management strategies almost depend on their values and beliefs. The long-term results following their values might change the physical response to regional climate. These are what I am concerned about and will lead me to research in the future.

References

- Wang, S.-H. (2022). *Investigating Role of Field Management on Energy Budgets and Soil Moisture in Tea Fields*. National Taiwan University, Taiwan.
- Wang, S.-H., & Juang, J.-Y. (2022). Quantifying the influence of management strategies on surface radiation budgets and energy patterns in tea fields. *Environmental Research Letters*, 17(3), 034041. doi:10.1088/1748-9326/ac4361
- Wang, S.-H., & Juang, J.-Y. (2024). Different management strategies exert distinct influences on microclimate of soil and canopy in tea fields through surface-atmosphere interactions. *Agricultural Water Management*, 291, 108617. doi:10.1016/j.agwat.2023.108617