SDG13 Climate Action 氣候行動

Climate Action Plan, shared Year: 2023

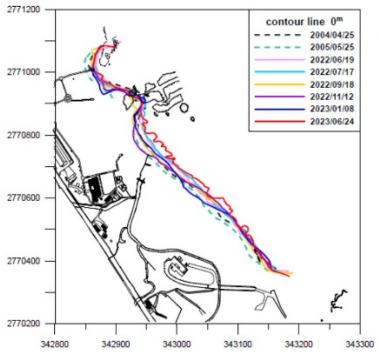
1. **The Environmental Survey and Evaluation of the Nuclear Power Plant No. 4 Units 1 and 2 Power Generation Project – Supervision of the Short-Term Beach Nourishment at Yanliao Coa** 核能四廠第一、二號機發電計畫環境調查評析–鹽寮海岸短期性養灘之監督工作

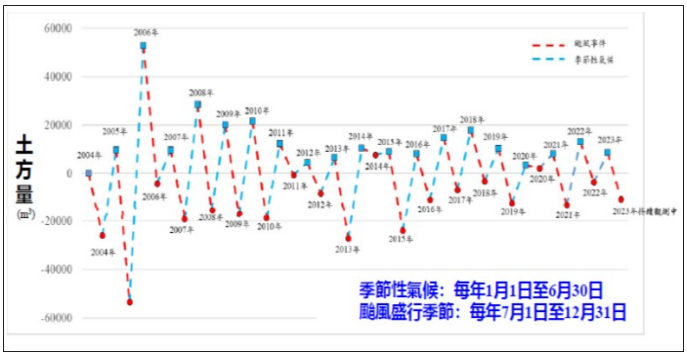
   Based on the results of beach terrain monitoring over the years at Yenliao Beach in the Northeastern corner, it is evident that short-term variations in the monitored area are primarily attributed to typhoon events. The amount of sand and sediment variation varies depending on the path and scale of the typhoon events. Following these typhoon events, the beach terrain gradually shows signs of recovery and accretion as the influence of the northeastern monsoon weakens. The variations in sediment quantity and the position of the 0-meter contour line over the monitoring period are illustrated in Figures 1 and 2, respectively.

   Sustainable Impact: aligns with SDG13.3.2 by contributing to a climate action plan that addresses the environmental impact of coastal changes. The supervision of short-term beach nourishment at Yanliao involves monitoring coastal erosion and sediment variations caused by typhoon events, providing critical data for developing coastal resilience strategies. By sharing this data with local government and community groups, the project helps inform collaborative climate action, enabling adaptive measures for managing the environmental impacts of extreme weather events, thus fostering sustainable coastal management and climate resilience.

   東北角鹽寮沙灘地形變動監測，根據歷年沙灘地形監測成果顯示：監測區鹽寮沙灘短期性變動因素為颱風事件，沙灘土砂變動量視颱風行徑及其規模有所差異，颱風事件後沙灘地形隨東北季風的減弱漸次呈現回淤變化，監測歷程之土砂量及 0m 灘線的變動情形分別如圖 1 及圖 2 所示。

   永續影響力:此計畫監測鹽寮海岸侵蝕與颱風引發的沉積變化，為沿岸韌性策略提供數據，並促進地方政府與社區的氣候行動協作，以支持永續海岸管理與氣候韌性。





Evidence:

https://oet.ntou.edu.tw/p/405-1061-104044,c7466.php?Lang=zh-tw

2. **Investigation on coastal wetland carbon sink and establishment of measurement methodology** 海岸濕地碳匯量測方法學及本土係數建立

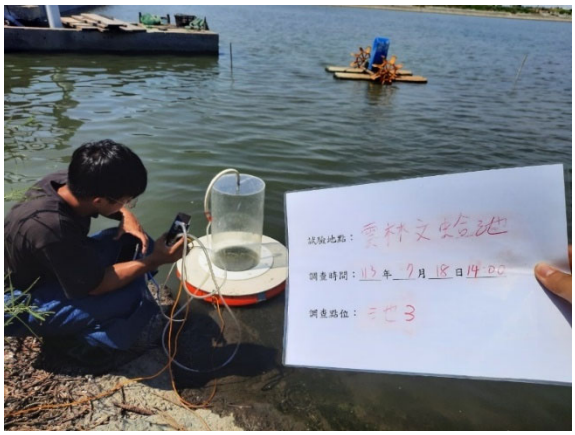
   According to the Ministry of Agriculture's key strategic action plan for Taiwan's 2050 net-zero transition "Natural Carbon Sinks" released in April 2023, the current national greenhouse gas inventory

report only includes forest carbon sink data in the "Land Use, Land-Use Change, and Forestry" section. Important carbon sink data for our country's soil, ocean, and wetlands have not been included due to the lack of an MRV (Monitoring, Reporting, Verification) mechanism tailored to our environmental conditions, resulting in a lack of basic carbon sink inventory and annual variation data. Therefore, to understand the overall changes in carbon sequestration and the potential emission reductions in our country, it is essential to actively develop ocean carbon sink measurement methods, establish local coefficients, and develop baseline data.Through the execution of this project, we aim to establish baseline data for our country's coastal wetlands, facilitating the future establishment of measurement and evaluation methods, estimation of carbon sequestration potential, and verification methods for carbon sinks.

Sustainable Impact: aligns with SDG13.3.2 by contributing to the development of a climate action plan that focuses on enhancing carbon sequestration in coastal wetlands. By creating a methodology for measuring carbon sinks and establishing local baseline data, this project supports Taiwan's 2050 net-zero transition strategy. Sharing this data with local governments and community groups enables informed decision-making and climate action, promoting the inclusion of coastal wetlands in national carbon sink inventories. This effort enhances the ability to monitor, report, and verify carbon sequestration, contributing to climate mitigation strategies.

根據 112 年 4 月農業部發布之臺灣 2050 淨零轉型「自然碳匯」關鍵戰略行動計畫，目前我國國家溫室氣體清冊報告僅於《土地利用、土地利用變化及林業部門》章節中盤點及收納森林碳匯相關資料，我國土壤、海洋與濕地等重要碳匯量資料，因尚未依我國環境條件建立相符之 MRV 機制（Monitoring, Reporting, Verification），缺乏基礎碳匯量盤點及每年變動量等資料，因此，為瞭解我國整體碳匯變動量與可抵減之排放量，應積極建構海洋碳匯量測方法、建立本土係數與發展基線資料。透過本案之執行，期望可建構我國海岸濕地之基線資料，俾利未來建立量測與計量評估、增匯潛力估算與碳匯量認驗證方法之目標。

永續影響力： 此計畫透過建立碳匯測量方法和當地基線數據，支持台灣 2050 淨零轉型，並促進濕地納入碳匯清單，加強氣候減緩能力。



Evidence:

https://www.fa.gov.tw/view.php?theme=Press_release&subtheme=&id=1982

Co-operative planning for climate change disasters Year: 2023

3. **Placement of Marine Weather Data Buoys** 協助中央氣象局完成海氣象資料浮標佈放

The world faces significant issues with climate change, and extreme weather poses serious threats to human life, property, and well-being. If the Central Weather Bureau can accurately and effectively collect meteorological data, it can provide more precise weather forecasts to help people avoid disaster-prone conditions, ensuring the smooth conduct of activities such as maritime recreation, fishing operations, navigation, ecological protection, construction projects, and resource surveys.
Oceanographic data buoys are widely used internationally to collect marine environmental data, with about 500 anchored buoys worldwide. Due to their placement in marine environments, they face increased wear and tear from wave action and equipment aging. If the anchors or ropes break, the buoys can drift and fail to perform their observation tasks. Therefore, annually redeploying or replacing equipment is a crucial task.
The Central Weather Bureau commissioned National Taiwan Ocean University to update and maintain the 2023 buoy system and anchoring equipment. On June 23, 2024, the Research Vessel Hsin Hai Yen No. 2 from the university arrived at the designated location at Pengjia Islet. After assessing the local depth and topography, buoy deployment began. The vessel then met with the divers' boat at the old anchor point, where divers disassembled the old buoy's underwater anchoring. The old buoy was then lifted to the aft deck for recovery. After verifying the new buoy's accuracy on-site, the mission was completed, and the vessel returned.
Marine meteorological buoys accurately record data on air pressure, water temperature, air temperature, wave height, wave period, wave direction, wind direction, and wind speed. Each data point is transmitted within minutes, providing real-time updates to meteorologists and disaster response units. This helps reduce personnel and property losses from disasters and ensures smoother operations and economic activities at sea.
Data buoys transmit a large volume of marine meteorological information, which is crucial for weather forecasting and maritime safety assessments. After the Central Weather Bureau collects and consolidates this data, it is sent in real-time to relevant agencies such as the National Science and Technology Center for Disaster Reduction, the Ministry of Economic Affairs' Water Resources Agency, the Council of Agriculture's Fisheries Agency, the Ocean Affairs Council's Coast Guard Administration, and the Ministry of Transportation and Communications' Tourism Bureau. Additionally, the data is published on marine meteorological observation websites for use across various sectors, enhancing early warning and disaster prevention capabilities.
Sustainable Impact: aligns with SDG13.3.3 by contributing to cooperative planning for climate change disasters through real-time data collection and collaboration with government agencies. By supporting the Central Weather Bureau in deploying and maintaining marine weather buoys, this initiative provides critical meteorological data to enhance weather forecasting and disaster preparedness. The real-time information is shared with multiple government agencies, aiding in early warning systems and minimizing the impact of extreme weather events. This cooperative effort helps prevent property loss, ensure maritime safety, and improve disaster response strategies, contributing to regional and local climate resilience.

全球面臨氣候變遷的重大議題，極端氣候的產生對人類的生活、生命、財產有著重大的危害，中央氣象署若是能精準有效的蒐集資料氣象資料，更能提供民眾更準確的氣象預報，使民眾能避開致災天候，確保海域休憩活動、漁船作業、航行交通、生態環境保護、工程作業、資源調

查等能順利進行。

海洋資料浮標為目前國際間大量使用來蒐集海洋環境資料的儀器，全球約有 500 座錨繫式海上資料浮標，因為置放在海洋環境之中，經海浪拍打、侵蝕設備老化故障頻率增高，錨繫、繩索一但斷裂更會導致浮標移位，而無法執行觀測任務，因此每年重新布建或更換設備成為級具重要的任務之一。

國立臺灣海洋大學研發處研究船船務中心新海研 2 號受中央氣象署委託，協助執行 112 年度資料浮標系統及錨繫設備更新維護，於 113 年 6 月 23 日出海抵達彭佳嶼資料浮標預定地點，詳細確認附近水深地形狀況後，開始進行浮標布放作業，再前往資料浮標舊錨碇點與潛水員小艇會合，由潛水員進行舊資料浮標水下錨繫解開作業，再將舊浮標吊至後甲板固定，完成資料浮標回收作業，並現場確認新資料正確後完成任務返航。

海氣象浮標能正確紀錄氣壓、水溫、氣溫、波高、波浪週期、波向、風向風速等數據，每一筆數據都能在幾分鐘內完成資料傳輸，達到即時提供最新數據給氣象預報人員及防災救護單位，降低災害造成的人員及財產損失，使海上各項作業、經濟活動等能更順暢。

資料浮標傳回大量的海象資訊，成為天氣預告、海上安全評估等重要數據，經海經中央氣象署蒐集彙整其他數據後，即時傳送至國家防災防救科技中心、經濟部水利署、農委會漁業署、海洋委員會海巡署、交通部觀光局等相關單位，且公布於海象觀測網站提供民間各個領域使用，達到預警、災害防治等效能。

永續影響力: 此計畫透過部署海洋氣象浮標提供即時數據，加強天氣預報和災害應變，並與多個政府單位合作，提升氣候韌性與海上安全

Evidence:

https://reurl.cc/7dMEkD

4. **The 10th Monitoring and Forecasting Technologies for Marine Environments and Hazards Conference** 第十屆海峽兩岸海洋環境監測及預報技術研討會

Marine environmental impacts and disasters due to global warming and climate change are some of the most critical issues in this century. The management of marine environments and reductions in coastal disasters with the development and application of key technologies in observations, ocean models, big data and artificial intelligence approaches are crucial. The topics listed below and other related works are welcome:Long-term observation declaring the impacts of climate changes on the marine environment.Developments and applications of observational techniques like remote sensing (radar and satellite).Developments and applications of forecasting technology including ocean models as well as

big data and artificial intelligence approaches.Evaluation and management of marine environmental, biological, geochemical, and ecological disasters.

Sustainable Impact: aligns with SDG13.3.3 by promoting cooperative planning for climate change disasters through the development and application of advanced technologies. The conference focuses on long-term marine environmental monitoring, forecasting technologies, and the use of big data and AI to predict and mitigate climate-related disasters. By bringing together experts and fostering collaboration across regions, the conference supports the sharing of critical data and technologies that enhance disaster preparedness and response, aiding in the protection of coastal communities from the impacts of climate change.

本研討會為兩岸海洋學界在海洋環境監測與預報技術領域學術交流及科研合作的重要平台，期望提升雙方研究和應用能力，維護臺灣海峽海上安全，造福海峽兩岸人民。由於兩岸面對面交流尚未完全解封，本屆研討會採用現場與視訊會議同步舉行，分別於臺灣海洋大學與廈門大學會場視訊連結。

永續影響力：此研討會透過觀測技術、預報科技及大數據應用，加強海洋環境管理與災害防範，減少氣候變遷帶來的海洋災害風險，促進氣候韌性。

Evidence:

https://r088.ntou.edu.tw/var/file/103/1103/img/1564/432290353.html

5. **The 19th Cross-Strait Climate & Energy Forum** 2023 第十九屆海峽兩岸氣候變遷與能源永續發展論壇

The 19th Cross-Strait Climate & Energy Forum at NTOU, initiated in 2005, fosters cooperation in energy, climate, and the environment. This year's theme, "Building a New Energy System," features 6 special guest speakers and 18 keynote speakers, discussing new energy, smart tech, and regional consensus for clean energy. President Hsu Tai-Wen's smart oceans talk drew attention.

Sustainable Impact: promoting dialogue on sustainable energy solutions across regions. Through expert discussions on new energy systems, smart technology, and clean energy consensus, it advances cooperative efforts in climate resilience and energy sustainability. This collaboration supports innovative, sustainable energy development.

本論壇為 2005 年由兩岸學者共同發起並積極促成的一項由兩岸高校交替主辦的高水準學術交流活動，期望在能源、氣候和環境等領域廣泛開展具有前瞻性的合作。以「新型能源體系構建」

為主題，邀請兩岸 6 位特邀講者與 18 位專題講者，透過一整天的專題研討，從新能源現況、智慧化等科技技術導入進行交流，為高效安全、清潔低碳的新能源構建，建立區域共識！許泰文校長也以智慧海洋之建置與應用為題專題演講，獲得現場熱烈的關注。

永續影響力: 此論壇透過專家討論新型能源系統及智慧科技，推動跨區域的清潔能源合作，促進氣候韌性與能源永續發展。

Evidence: ttps://www.facebook.com/story.php/?story_fbid=709629531181490&id=100064033477937

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6. **Low-carbon energy tracking** 低碳能耗追蹤 2023 年

NTOU's low-carbon energy is generated mainly through on-campus offshore wind power, and the amount of low carbon energy used is calculated as follows:

1.) Generation Rate(2022)=total generation by wind power/(total device capacity)
=3542.9(GWh/year)/(1581.06(MW) × 8760(hour/year))
=0.256

2.) Low carbon energy generated= device capacity×Generation Rate
=19.8(kw) ×0.256
=19.8*1000(J/s) ×0.256

3.) Our annual the amount of low carbon energy used (GJ/year)
=19.8*1000(J/sec)×0.256× 31536000 (sec/year)
=159849676800(J/year)
≈159.85(GJ/year)

Sustainable impact : NTOU generates low-carbon energy mainly from offshore wind power. Calculated at 159.85 GJ/year, this significantly reduces carbon emissions.
Supports UN SDG Target 13.2 for a sustainable campus energy strategy

永續影響力：本校的低碳能源主要來自離岸風電。年使用量約為 159.85 GJ，有效減少碳排放。支援聯合國 SDG 目標 13.2，實現校園能源永續。

7. **Campus Carbon Footprint Verification (CFV) activate Meeting** 校園碳盤查啟動會議會議紀錄
In line with global trends toward net-zero emissions and sustainable low-carbon development, the university has pledged to achieve carbon neutrality by 2050. The year 2023 is set as the baseline year, prompting immediate carbon audits for the Keelung and Matsu campuses, with plans to complete a carbon audit report and emissions inventory. The Sustainability Center has consulted multiple advisory firms and confirmed support for ISO 14064-1:2018 (Category 1 and 2) greenhouse gas quantification and reporting, aiming to complete the 2023 carbon audit report with preliminary reduction pathway recommendations by December 31, 2023.
Due to the tight two-month timeframe, this report will not undergo third-party verification. Following a recent meeting, a Carbon Audit Task Force was established, led by Director Tsai Guo-Jen of the Center for Social Responsibility and Sustainable Development, with six senior managers as team members

responsible for guiding and overseeing audit tasks. Beyond the standard ISO 14064 items, additional audit categories were discussed and approved. Task Force members are expected to ensure comprehensive data collection, including unregistered assets (e.g., refrigerators, air conditioners), materials (e.g., welding rods, WD40), and utility and waste management data. Upon initiation, all collected data will be consolidated and reported to the Sustainability Center for further management..
Sustainable impact: NTOU launched a carbon audit to establish a 2023 emissions baseline toward 2050 carbon neutrality. Guided by ISO 14064-1:2018 standards, this includes additional data on campus emissions. This effort advances UN SDG 13.2 through structured emission tracking and reduction planning.

鑑於全球淨零排放浪潮與低碳轉型永續發展趨勢，本校宣示 2050 年達到碳中和。2024 年為本校淨零排放基準年，需儘速進行基隆校區及馬祖校區碳盤查，完成碳盤查報告及建立排放量清冊。永續中心已洽詢多家顧問公司，經訪查徵詢，確認本年度可進行 ISO 14064-1:2018 版(類別 1、類別 2)組織層級溫室氣體排放與移除之量化及報告輔導，並於本(112)年底 112 年 12 月 31 日前完成 2023 年碳盤報告書(含簡略減碳路徑建議)，惟顧及本次作業時程僅 2 個月，爰本次報告書不做第三方驗證。經本次會議決議，本校依據 ISO14064 碳盤查項目及所對應本校項目管理單位，成立本校碳盤查推動小組，由社會責任實踐與永續發展中心蔡主任國珍擔任召集人，六位一級主管為小組成員，負責推動、督導及本校碳盤查作業。除原規劃 ISO14064 項目外，經本次會議討論新增盤查項目如下表所示，請推動小組成員確實掌握所需盤查項目之數據，若有未登錄系統之財產(如冰箱、冷氣等)、使用物品(如焊條、WD40 等)之相關數據，請負責單位協助全校總調查，並後續管控其數量與有關用水、用電、廢棄物處理等情形；俟碳盤查作業啟動，將所有數據通報永續發展中心彙整。
永續影響力：本校啟動碳盤查，以 2024 年為基準，邁向 2050 碳中和目標。依據 ISO 14064-1:2018 標準，包含校園多項額外排放數據。此措施推動聯合國 SDG 目標 13.2，促進排放監測和減碳規劃。

Evidence:
https://r088.ntou.edu.tw/var/file/103/1103/img/1564/199114244.pdf
https://r088.ntou.edu.tw/var/file/103/1103/img/1564/298127073.pdf

8. **Energy Turnover ~ Marine Renewable Energy Research Camp** 翻轉能源~海域再生能源探究營
Come and experience a fantastic journey of marine technology! This base has a complete set of dazzling equipment, allowing you to see the infinite possibilities of marine energy in the future! First of all, we have a real sea area test site, which is located between Keelung Island, Heping Island and Hainan University Binhai Campus. It has a tidal energy and wave energy test area of about 1.4 square kilometers. The water depth and sea conditions here are perfectly suitable for installing a floating wind turbine platform, and our data buoys and ADCP systems have been collecting valuable data for over a decade! Next, don't forget to visit our medium and small scale laboratories, which are small experimental areas for marine energy research! We have a high-tech flat flume equipped with four sets of Edinburgh wave generators, capable of conducting precision experiments on various small wave energy units. In addition, the Ocean Energy Creative Implementation Competition is held every year, allowing students to display their creative works and test the power generation efficiency. It is really

lively! Finally, come and take a look at the virtual ocean power grid management system we just completed! This system shows the entire process of how ocean energy flows from power plants to your home grid, as well as life application displays in various special situations, allowing you to understand how ocean energy can be integrated into daily life.

Sustainable Impact: aligns with SDG13.3.1 by providing an educational platform that raises awareness about climate change and renewable energy solutions. Through hands-on experience with marine energy technologies, such as tidal and wave energy, participants learn about the risks and impacts of climate change and the role renewable energy can play in mitigation and adaptation. The camp also features a competition that fosters innovation in energy generation, contributing to impact reduction. This program supports climate education by highlighting sustainable energy practices and their integration into everyday life, thus promoting climate change awareness and action.

快來體驗一場海洋科技的奇幻之旅！本基地擁有一整套超炫的設備，讓你看見未來海洋能源的無限可能！首先，我們有 實海域測試場，它坐落於基隆嶼、和平島與海大濱海校區之間，擁有大約 1.4 平方公里的潮流能和波浪能測試區。這裡的水深和海況完全符合安裝浮式風力發電平臺的要求，並且我們的資料浮標和 ADCP 系統已經收集了超過十年的寶貴數據！ 接著，別忘了參觀我們的 中、小尺度實驗室，這裡可是海洋能源研究的小型實驗天地！我們有高科技的平面水槽，配備四組愛丁堡造波機，能夠進行各種小型波浪能機組的精密實驗。此外，每年還會舉辦 海洋能源創意實作競賽，讓學生展示創意作品，並測試發電效率，真是熱鬧非凡！最後，快來瞧瞧我們剛完成的 虛擬海域電網管理系統！這個系統展示了海域能源如何從發電場到你家電網的全過程，還有各種特殊情境的生活應用展示，讓你了解海洋能源如何融入日常生活。

永續影響力：基地提供海洋能源的研究與教育場域，推動大眾對海洋科技的認識。藉由創意競賽和虛擬電網管理系統展示，提升學生及社區對能源永續的意識。這些活動支持聯合國 SDG 13.3 的教育與氣候意識提升。

Evidence:

https://www.facebook.com/energyntou/

https://r088.ntou.edu.tw/var/file/103/1103/img/1564/315648533.docx

https://r088.ntou.edu.tw/var/file/103/1103/img/1564/556659099.jpg

https://r088.ntou.edu.tw/var/file/103/1103/img/1564/290938220.jpg

https://r088.ntou.edu.tw/var/file/103/1103/img/1564/393020951.jpg

9. **National Ocean Energy Creative Implementation Competition** 全國海洋能創意實作競賽

Expansion of the Competition: Starting in the year 2016 (Republic of China 105), National Taiwan Ocean University, in collaboration with the Keelung City Government, jointly organized this competition and expanded it to include participants from national and high schools. This initiative aims to stimulate the interest of young students in ocean energy and encourages them to bridge theoretical knowledge with practical applications, embodying the concept of learning by doing.

Utilization of Laboratory Resources: Competition teams primarily utilize the laboratories at National Taiwan Ocean University, providing them with the opportunity for hands-on experimentation and product validation. This assists students in testing and refining their designs in real-world environments.

Industry and Academic Collaboration: Part of the success of the competition can be attributed to the involvement of experts and scholars from both the industry and academia who serve as competition judges, offering professional advice and guidance. This interdisciplinary collaboration not only promotes knowledge exchange but also establishes a cooperative platform between the school and industry.

Sustainable Development Impact: This competition not only offers students a chance to hone their practical skills but also generates a social impact in the field of sustainable development. Ocean energy

is a significant source of renewable energy, and advancing research and development in this area contributes to environmental sustainability.

Sustainable Impact: aligns with SDG13.3.1 by providing an educational platform focused on the risks and impacts of climate change and the role of renewable ocean energy in mitigation and adaptation. By engaging students from various educational levels, the competition fosters climate awareness through hands-on experimentation in ocean energy technologies, bridging theoretical knowledge with practical application. The competition's emphasis on sustainable development and collaboration between academia and industry further enhances participants' understanding of climate change mitigation strategies, promoting early awareness and solutions for environmental sustainability.

海洋能源競賽的開始：自民國 100 年起，海洋大學開始舉辦海洋能源相關競賽。這競賽涵蓋了波能和流能轉換器的設計、效率計算、成本和安裝等領域。這個競賽已經持續多年，並取得了豐碩的成果。

競賽的擴大：民國 105 年開始，海洋大學與基隆市政府共同舉辦這個競賽，並擴大增辦了國、高中組。這個舉措有助於激發年輕學生對海洋能源的興趣，並鼓勵他們將理論知識與實際操作結合起來，實踐學以致用的理念。

實驗室資源的利用：競賽隊伍主要利用國立臺灣海洋大學實驗室，為參賽隊伍提供了實際操作和成品驗證的機會。這有助於學生們在實際環境中測試和改進他們的設計。

產業與學術合作：競賽的成功部分歸功於邀請產業界和學術界的專家學者擔任競賽評審，以提供專業建議和指導。這種跨界的合作不僅促進了知識交流，還建立了學校與產業之間的合作平台。

永續影響力：這個競賽不僅提供了學生們實踐技能的機會，還在永續發展領域產生了社會影響力。海洋能源是一個重要的再生能源來源，推動這方面的研究和發展有助於維護環境可持續性。

Evidence:

https://www.facebook.com/energyntou/
https://r088.ntou.edu.tw/var/file/103/1103/img/1564/536300017.jpg
https://r088.ntou.edu.tw/var/file/103/1103/img/1564/259145156.jpg

10. **2023 Marine Education Contribution Awards** 教育部 2023 海洋教育推手獎獎頒獎典禮
The 5th "Marine Education Promoter Award" included 3 group awards, 5 individual awards, 3 local government awards, and 5 curriculum and teaching team awards. The recipients came from foundations, private organizations, government agencies, and educators at all levels of schools. These marine education promoters, from diverse fields, excel at integrating local resources, highlighting regional characteristics, and fostering local engagement. They connect marine education to everyday life experiences, making learning about marine knowledge fun. On one hand, they inspire the public to explore and connect with the ocean, while on the other, they raise awareness about the protection and appreciation of marine resources.
Sustainable Impact: align with SDG13.3.1 by recognizing and promoting educational efforts that raise awareness about climate change and the sustainable use of marine resources. The awarded individuals and groups contribute to local education programs that integrate marine knowledge into everyday life, highlighting the importance of protecting marine ecosystems in the context of climate change. By connecting regional characteristics with marine education, these initiatives foster public understanding of climate risks, impacts, and adaptation, thereby inspiring broader community engagement in climate mitigation and environmental sustainability.

第五屆「海洋教育推手獎」計有「團體獎」3 名、「個人獎」5 名、「地方政府獎」3 名，以及「課程教學團隊獎」5 名，獲獎者涵蓋財團法人、民間團體、政府機關，以及各級學校的師長，這些來自不同場域的海洋教育推手們，善於結合在地資源、發揮在地特色、提升在地關懷，將海洋教育連結生活經驗，使學習海洋知識充滿樂趣，一方面激發國人探索與親近海洋的興趣、另一方面也喚醒國人對於海洋資源的保護與珍視。
永續影響力：「海洋教育推手獎」提升大眾對海洋保護與資源珍惜的意識。結合在地資源及生活經驗，增進社區對海洋教育的參與。支持聯合國 SDG 13.3，推廣氣候與環境意識教育。

Evidence: https://tmec.ntou.edu.tw/p/412-1016-11831.php?Lang=zh-tw

11. **Marine Science and Climate Change Education Seminar** 海洋科普及氣候變遷宣導講座

In 2023, the Taiwan Marine Education Center visited schools and gave seminars to educate students in elementary, junior high, and senior high schools about the importance of marine scientific knowledge. The Marine Science and Climate Change Education Seminar covered the five main learning themes stipulated in the Marine Education Issues section of the "Curriculum Guidelines of 12-Year Basic Education in National Primary and Secondary Schools and General Senior High School—Integrating Issues Course Handbook." Issues related to climate change were incorporated into the seminar in response to the United Nations declaring 2021–2030 as the decade of Ocean Science for Sustainable Development. The five themes covered in the seminar were "Marine Disaster Prevention and Water Safety," "Marine Culture and Society," "Marine Science and Technology," "Marine Resources and Sustainability," and "Climate Change and Development." Experts with relevant academic backgrounds and experience were invited to serve as speakers at the seminar.

Sustainable Impact: aligns with SDG13.3.1 by providing a comprehensive educational platform that raises awareness about the risks and impacts of climate change. The seminar educates students across various educational levels on the importance of marine science and its relationship to climate change, covering themes such as marine resources, sustainability, and disaster prevention. By incorporating climate change education in response to global initiatives like the UN's Ocean Decade, the seminar promotes early awareness and equips students with knowledge on climate mitigation and adaptation, contributing to a sustainable future.

臺灣海洋教育中心於 2023 年以講座辦理的方式向高中及國民中小學的學生分享海洋科普知識的重要性。「海洋科普及氣候變遷宣導講座」以國家教育研究院發佈之《十二年國教課程綱要國民中小學暨普通型高中議題融入說明手冊》中海洋教育議題五大學習主題為基礎，並響應聯合國宣布 2021 年至 2030 年為海洋科學促進永續發展十年，融入氣候變遷相關議題，訂定本系列講座主題為「海洋防災與水域安全」、「海洋文化與社會」、「海洋科學與技術」、「海洋資源與永續」及「氣候變遷與發展」等五大主題內容，邀請具有學術背景及推廣教育經驗之講師到校分享。

永續影響力：臺灣海洋教育中心以講座向學生推廣海洋科學及氣候變遷知識。講座涵蓋防災、安全、資源永續等議題，提升年輕世代的環境意識。符合 SDG 13.3 之氣候教育與意識推廣目標。

Evidence:

https://tmec.ntou.edu.tw/p/404-1016-94915.php?Lang=zh-tw

12. **Mao-ao Community Transregional Satoumi Network Communication Platform Conference** 卯澳跨區域里海網絡交流平台會議

In recent years, coastal communities have encountered significant challenges to sustainable development due to climate change, environmental degradation, shifts in industrial structures, the exploitation of marine resources, and the inherent vulnerabilities of coastal zones. To address the sustainable management of fisheries resources and associated industries within these communities, the principles espoused by the Satoyama Initiative—aimed at fostering harmony between human society and nature—along with the Satoumi concept, which underscores the coexistence of humans and marine ecosystems, offer a promising framework. These approaches are instrumental in promoting equilibrium between marine ecological landscapes and socio-ecological systems, aiding coastal communities in implementing Satoumi practices and advancing toward sustainable development.

Since 2020, the Mao-ao community has undertaken the development of a comprehensive Satoumi environmental education program and the establishment of model sites through the facilitation of focus group discussions and the integration of marine environmental education curricula. These initiatives are designed to foster sustainable coexistence between the livelihoods of fishing village residents and the natural environment. In recent years, the community has devoted considerable effort to advancing Satoumi experiential activities, promoting citizen science (including intertidal zone monitoring, underwater transects, and water quality assessments), and supporting local ecological production landscapes as integral components of Satoumi activities within fishing villages. Within this context, the forthcoming conference aims to critically examine local Satoumi awareness and developmental trajectories through the cross-regional exchange of perspectives among communities and stakeholders. Moreover, the conference seeks to strengthen partnerships within local organizations, enhance the integration of community-based management with marine environmental governance, and subsequently devise and refine strategies for the collaborative governance and sustainable development of coastal fisheries resources.

This platform conference, held on October 6, 2023, convened representatives from the Fisheries Research Institute of the COA, National Taiwan Ocean University, Dayseechat Social Enterprise Platform, the New Taipei City Government's Fisheries and Fishing Port Affairs Management Office,

Gongliao District Office, Gongliao Fishermen's Association, Fulian Village Office, Mao-ao Community Development Association, and the Taoyuan Stone Tidal Weir Association, with a total of 19 participants. The conference engaged in a scholarly exploration of developmental issues and prospective visions for the Mao-ao Satoumi area, addressing critical challenges such as the adverse effects of recent intense rainfall events that have led to severe turbidity in water flows into Mao-ao Bay, the degradation of coral reef ecosystems due to yacht anchoring in protected zones, and the erosion of traditional underwater harvesting practices by local male and female divers. Additionally, the Taoyuan Stone Tidal Weir Association contributed insights into traditional stone weir fisheries' historical evolution and cultural significance. The conference culminated in a comprehensive discourse among stakeholders aimed at jointly addressing localized issues, fostering inter-agency consensus, and formulating strategic interventions for sustainable improvement.

Sustainable Impact: aligns with SDG13.3.1 by fostering education and dialogue around the impacts of climate change on coastal communities and promoting sustainable marine practices. Through this platform, local stakeholders and experts explore solutions to the challenges posed by environmental degradation, shifting industrial structures, and marine resource exploitation, all exacerbated by climate change. By integrating Satoumi principles—focusing on the coexistence of humans and marine ecosystems—the conference encourages sustainable development strategies and early warning systems within coastal communities. This initiative educates and empowers local communities, enhancing their resilience to climate change through collaborative governance and marine resource management.

近年氣候與環境變遷、產業結構改變、海洋資源的開發利用及海岸地區脆弱性等，造成海岸社區的永續發展面臨許多嚴峻挑戰。為思考海岸社區的漁業資源與產業水續經營之問題，透過里山倡議所提出實現人類社會與自然和諧共處的願景，以及里海強調如何讓人類與海洋可以共存共生，促進海洋生態人文地景與社會生態系統的平衡，協助海岸社區來實踐里海，將有助社區朝永續發展邁進。

卯澳社區自 2020 年透過辦理里海場域建構之焦點團體座談及導入海洋環境教育課程，發展系統性的里海社區環境教育及典範場域建構，推動漁村社區居民生活與自然環境間之永續共存。近年致力於推廣里海體驗活動、公民科學(潮間帶觀察、水下側線、水質檢測等)、在地生產生態地景等漁村社區里海活動。基此，本會議期望透過跨區域社區與權益關係人的意見交流，探討在地里海意識與發展願景，並強化在地組織內的夥伴關係，提升社區與海洋環境經營管理的連結，進而擬定及調整海岸漁村資源共同治理及永續發展策略。

本平台會議於 112 年 10 月 6 日舉行，邀請農業部水產試驗所海洋漁業組、海洋大學、小社區大事件社企平台、新北市政府漁業及漁港事業管理處、貢寮區公所、貢寮區漁會、福連里辦公處、卯澳社區發展協會、桃園石滬協會等，人數共計 19 人，藉由會議共同探討卯澳里海場域發展議題與願景，包括近年強降雨沖刷地表導致嚴重混濁之泥水流入卯澳灣影響水質、遊艇於保育區下錨破壞珊瑚礁生態，以及傳統海男海女水下採集文化逐漸失傳等問題，接續也邀請桃園石滬協會分享傳統石滬漁業發展歷史脈絡與文化傳承，最後再由各權益關係人進行綜合探討與交流，共同商討地方問題，謀求各部會共識與改善策略。

永續影響力：卯澳社區透過里海倡議，推廣海洋環境教育與生態共存活動。會議討論社區永續發展與資源管理策略，加強居民環境意識。支持 SDG 13.3 之氣候意識與環境教育，促進海岸社區永續發展。

Evidence: https://satoumi.tw/

13. **establish Topics on Marine Environmental Ecology Sustainability** 開設海洋環境生態永續專題課程

The course aims to provide comprehensive knowledge of the marine environment, ecology, and sustainability. The course encourages students to initiate following recent marine ecological concepts related research by updated scientific articles reading and discussion, and by participating activities. The main topics: (1) Introduction to the marine environment (2) Introduction to the marine ecosystem (3) Introduction to climate change (4) How climate change influences marine ecology (5) Marine sustainability management. The course is designed according to SDG 4 Quality Education; 13 Climate Action; 14 Life Below Water; and 17 Partnerships for the Goals.

On Nov. 19, under the leadership of their professors, 10 students participated in a dyeing class at the Badouzi Industrial Tourism Promotion Association. Yam is a dye crop that has a deep connection with the Badouzi fishing village. Early fishermen used yams to dye cotton threads to make fishing nets to strengthen the fibers. The sodium ions in the seawater became the medium for plant dyeing and played a role in fixing the color. The dyeing on the mountain is combined with intertidal seawater rinsing to inherit the unique fishing village cultural skills of Badouzi and allow participants to experience the unique local natural and sustainable mountain and sea customs.

Sustainable Impact: strongly aligns with SDG13.3.1 by educating students about the risks and impacts of climate change, particularly on marine ecosystems. Covering key topics such as climate change, marine sustainability management, and how climate change influences marine ecology, the course promotes awareness and engagement with climate mitigation and adaptation strategies. By integrating hands-on activities, like the Badouzi fishing village dyeing class, students learn about the sustainable practices deeply rooted in local culture. This approach fosters a deeper understanding of both global and local climate issues, contributing to early education and action on climate change.

該課程旨在提供有關海洋環境、生態和永續發展的全面知識。該課程鼓勵學生透過閱讀和討論最新的科學文章來主動追蹤最新的海洋生態概念相關研究，並藉由親身體驗活動獲得不同的海洋生態永續知識與觀念。課程主要議題有： （1）海洋環境介紹（2）海洋生態系介紹（3）氣候變遷介紹（4）氣候變遷如何影響海洋生態（5）海洋永續管理。本課程設計根據聯合國永續發展目標 SDG 4 優質教育；13 氣候行動；14 水下生命；和 17 實現目標的夥伴關係。

10 名學生於 2023 年 11 月 19 日在老師的帶領下，參與八斗子產業觀光促進會舉辦之「薯榔海水染布+漁村走讀」課程活動。薯榔是種染料作物，與八斗子漁村頗有淵源，早期漁民用薯

榔染於棉線織成的漁網加固其纖維，而海水中的鈉離子成為植物染的媒介起到固色的作用。薯榔海染將山上的薯榔植物染結合潮間帶海水漂洗，國際學生習得在地漁村文化特色的技藝並體驗當地獨特的環境永續山海風情。

永續影響力：課程結合實地體驗，讓學生學習海洋環境與氣候變遷對生態的影響。學生透過染布與走讀活動認識在地漁村文化及環境永續實踐。SDG 13.3 目標，提升氣候意識與環境保護知識。

Evidence:

https://imme.ntou.edu.tw/platform/home.php#content

https://r088.ntou.edu.tw/var/file/103/1103/img/1564/250280528.jpeg

14. **Riding the Wind and Wave Publication**《乘風躍浪》書籍出版

National Taiwan Ocean University boasts a rich marine research environment and resources unmatched by other institutions. Its mission is to actively integrate academic resources and expand its societal impact, with the hope of reaching new heights in establishing Taiwan as a "marine kingdom." This book explores four key dimensions: economic innovation, humanistic care, ecological conservation, and future vision. Through 31 action plans, it shares the "NTOU model," highlighting initiatives from campus actions to local practices and international connections, creating a new paradigm for the university's mission.

Sustainable Impact: aligns with SDG13.3.1 by raising awareness about climate change and marine sustainability through education and action plans. The book covers key dimensions such as ecological conservation and economic innovation, promoting the importance of protecting marine ecosystems and addressing climate-related challenges. By sharing 31 action plans and the "NTOU model," it highlights both local and international initiatives aimed at mitigating climate impacts and fostering sustainable development. This publication serves as an educational tool, encouraging societal engagement and spreading knowledge on climate change risks, impacts, and solutions.

海大擁有它校難以比擬的豐富海洋研究環境與能量，海大的使命是積極整合學術資源，擴大社會影響力，期盼另創臺灣「海洋王國」封號之新高峰。本書透過透過經濟創新、人文關懷、生態保育、未來願景等四大面向，從校園行動、地方實踐跨向國際鏈結，透過 31 個行動方案，分享海大模式，為大學的使命開創新局。

永續影響力：透過教育與行動計畫提升氣候變遷與海洋永續意識。分享 31 項行動計畫，推廣生態保護與氣候挑戰應對方法。作為教育工具，鼓勵社會參與並傳播氣候風險知識。

Evidence: https://mprp.ntou.edu.tw/p/404-1017-65498.php?Lang=zh-tw

15. **(Taiwan) national "Development and Application of Ocean Detection and Environmental Analysis Technology under Climate Change" integration plan** 執行國科會(NSTC)「鱸魚精準餵食及養殖環境監測與智能生產決策系統研究與開發 」計畫

1.) The motor department team implements the "Research and Development of Bass Precision Feeding and Breeding Environment Monitoring and Intelligent Production Decision-making Systems" project.

2.) This department provides relevant academic exchanges and lectures to allow our school and local personnel to obtain information professional education resources.

3.) This department provides 30 special lectures on understanding electrical machinery, allowing participating students/personnel to have a general understanding of the professional knowledge of electrical machinery.

1.) 電機系團隊執行「鱸魚精準餵食及養殖環境監測與智能生產決策系統研究與開發」計畫。

2.) 本系提供相關學術交流與演講，讓本校及在地人員獲得資訊專業教育資源。

3.) 本系提供數 30 場認識電機專題演講，讓參與學生/人員對電機學習的專業知識有概括性的了解。

Evidence:

https://cse.ntou.edu.tw/var/file/63/1063/img/849864291.pdf

https://reurl.cc/yv2jDO (P2)

SDG 13.3.4 Inform and support government　Year: 2023

16. **Placement of Marine Weather Data Buoys** 協助中央氣象局完成海氣象資料浮標佈放

The world faces significant issues with climate change, and extreme weather poses serious threats to human life, property, and well-being. If the Central Weather Bureau can accurately and effectively collect meteorological data, it can provide more precise weather forecasts to help people avoid disaster-prone conditions, ensuring the smooth conduct of activities such as maritime recreation, fishing operations, navigation, ecological protection, construction projects, and resource surveys.

Oceanographic data buoys are widely used internationally to collect marine environmental data, with about 500 anchored buoys worldwide. Due to their placement in marine environments, they face increased wear and tear from wave action and equipment aging. If the anchors or ropes break, the buoys can drift and fail to perform their observation tasks. Therefore, annually redeploying or replacing equipment is a crucial task.

The Central Weather Bureau commissioned National Taiwan Ocean University to update and maintain the 2023 buoy system and anchoring equipment. On June 23, 2024, the Research Vessel Hsin Hai Yen No. 2 from the university arrived at the designated location at Pengjia Islet. After assessing the local depth and topography, buoy deployment began. The vessel then met with the divers' boat at the old anchor point, where divers disassembled the old buoy's underwater anchoring. The old buoy was then lifted to the aft deck for recovery. After verifying the new buoy's accuracy on-site, the mission was completed, and the vessel returned.

Marine meteorological buoys accurately record data on air pressure, water temperature, air temperature, wave height, wave period, wave direction, wind direction, and wind speed. Each data point is transmitted within minutes, providing real-time updates to meteorologists and disaster response units. This helps reduce personnel and property losses from disasters and ensures smoother operations and economic activities at sea.

Data buoys transmit a large volume of marine meteorological information, which is crucial for weather forecasting and maritime safety assessments. After the Central Weather Bureau collects and consolidates this data, it is sent in real-time to relevant agencies such as the National Science and Technology Center for Disaster Reduction, the Ministry of Economic Affairs' Water Resources Agency, the Council of Agriculture's Fisheries Agency, the Ocean Affairs Council's Coast Guard Administration, and the Ministry of Transportation and Communications' Tourism Bureau. Additionally, the data is published on marine meteorological observation websites for use across various sectors, enhancing early warning and disaster prevention capabilities.

Sustainable Impact: aligns with SDG13.3.4 by informing and supporting government agencies in early warning and disaster monitoring related to climate change. Through real-time data collection on marine weather conditions, the buoys provide crucial meteorological information to various government bodies, including the National Science and Technology Center for Disaster Reduction and the Fisheries Agency. This data supports accurate weather forecasting, improves disaster preparedness, and enhances the capacity to mitigate risks associated with extreme weather events, thereby aiding local and regional governments in protecting lives, property, and economic activities.

全球面臨氣候變遷的重大議題，極端氣候的產生對人類的生活、生命、財產有著重大的危害，中央氣象署若是能精準有效的蒐集資料氣象資料，更能提供民眾更準確的氣象預報，使民眾能

避開致災天候，確保海域休憩活動、漁船作業、航行交通、生態環境保護、工程作業、資源調查等能順利進行。

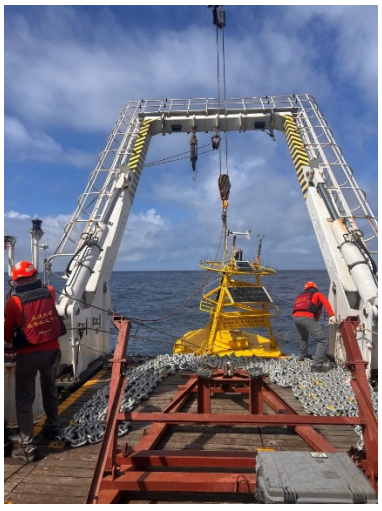
海洋資料浮標為目前國際間大量使用來蒐集海洋環境資料的儀器，全球約有 500 座錨繫式海上資料浮標，因為置放在海洋環境之中，經海浪拍打、侵蝕設備老化故障頻率增高，錨繫、繩索一但斷裂更會導致浮標移位，而無法執行觀測任務，因此每年重新布建或更換設備成為級具重要的任務之一。

國立臺灣海洋大學研發處研究船船務中心新海研 2 號受中央氣象署委託，協助執行 112 年度資料浮標系統及錨繫設備更新維護，於 113 年 6 月 23 日出海抵達彭佳嶼資料浮標預定地點，詳細確認附近水深地形狀況後，開始進行浮標布放作業，再前往資料浮標舊錨碇點與潛水員小艇會合，由潛水員進行舊資料浮標水下錨繫解開作業，再將舊浮標吊至後甲板固定，完成資料浮標回收作業，並現場確認新資料正確後完成任務返航。

海氣象浮標能正確紀錄氣壓、水溫、氣溫、波高、波浪週期、波向、風向風速等數據，每一筆數據都能在幾分鐘內完成資料傳輸，達到即時提供最新數據給氣象預報人員及防災救護單位，降低災害造成的人員及財產損失，使海上各項作業、經濟活動等能更順暢。

資料浮標傳回大量的海象資訊，成為天氣預告、海上安全評估等重要數據，經海經中央氣象署蒐集彙整其他數據後，即時傳送至國家防災防救科技中心、經濟部水利署、農委會漁業署、海洋委員會海巡署、交通部觀光局等相關單位，且公布於海象觀測網站提供民間各個領域使用，達到預警、災害防治等效能。

永續影響力: 海氣象資料浮標提供即時數據，加強天氣預測和海上安全，並支援各機構的災害防範。此即時資料有助於減少人員與財產損失，確保海上活動順利進行，提升防災能力。



Evidence:

https://reurl.cc/7dMEkD

17. **Investigation on coastal wetland carbon sink and establishment of measurement methodology** 海岸濕地碳匯量測方法學及本土係數建立

According to the Ministry of Agriculture's key strategic action plan for Taiwan's 2050 net-zero transition "Natural Carbon Sinks" released in April 2023, the current national greenhouse gas inventory report only includes forest carbon sink data in the "Land Use, Land-Use Change, and Forestry" section. Important carbon sink data for our country's soil, ocean, and wetlands have not been included due to the lack of an MRV (Monitoring, Reporting, Verification) mechanism tailored to our environmental conditions, resulting in a lack of basic carbon sink inventory and annual variation data. Therefore, to

understand the overall changes in carbon sequestration and the potential emission reductions in our country, it is essential to actively develop ocean carbon sink measurement methods, establish local coefficients, and develop baseline data.Through the execution of this project, we aim to establish baseline data for our country's coastal wetlands, facilitating the future establishment of measurement and evaluation methods, estimation of carbon sequestration potential, and verification methods for carbon sinks.

Sustainable Impact: aligns with SDG13.3.4 by providing essential support to the government for climate change risk monitoring and disaster prevention. This project develops a tailored MRV (Monitoring, Reporting, Verification) mechanism to assess carbon sequestration in coastal wetlands, offering critical data that can inform Taiwan's 2050 net-zero strategy. By establishing local coefficients and baseline data for wetlands, the project enhances the government's ability to monitor carbon sinks and their potential for reducing emissions, supporting regional climate action and resilience through informed policy decisions.

根據 112 年 4 月農業部發布之臺灣 2050 淨零轉型「自然碳匯」關鍵戰略行動計畫，目前我國國家溫室氣體清冊報告僅於《土地利用、土地利用變化及林業部門》章節中盤點及收納森林碳匯相關資料，我國土壤、海洋與濕地等重要碳匯量資料，因尚未依我國環境條件建立相符之 MRV 機制（Monitoring, Reporting, Verification），缺乏基礎碳匯量盤點及每年變動量等資料，因此，為瞭解我國整體碳匯變動量與可抵減之排放量，應積極建構海洋碳匯量測方法、建立本土係數與發展基線資料。透過本案之執行，期望可建構我國海岸濕地之基線資料，俾利未來建立量測與計量評估、增匯潛力估算與碳匯量認驗證方法之目標。

永續影響力: 此計畫透過建立海岸濕地碳匯量測方法，提供本土基線數據，支持台灣 2050 淨零轉型，促進碳匯監測與減排策略的發展。

Evidence:

https://www.fa.gov.tw/view.php?theme=Press_release&subtheme=&id=1982

18. **Investigation on aquaculture carbon sink and establishment of measurement methodology** 養殖漁業碳匯調查及建立量測方法學研究

Since our country has not yet established a corresponding Monitoring, Reporting, and Verification (MRV) mechanism, the national greenhouse gas inventory has not included data on wetland carbon sequestration. To understand the overall changes in carbon sequestration and the potential reduction of emissions in our country, as well as to meet the three major principles (measurable, verifiable,

reportable) and five key characteristics (additionality, exclusive claim to GHG reductions, permanence, avoiding social and environmental harms, and avoiding overestimation) required for future voluntary reduction projects, this project will measure greenhouse gases and carbon sequestration in the water bodies and sediments of aquaculture, specifically in the milkfish and sea bass farming industries. Through the execution of this project, we hope to accurately estimate the carbon sequestration or carbon source capacity of wetlands to align with international net-zero emission trends and achieve domestic net-zero emission policy goals.

Sustainable Impact: aligns with SDG13.3.4 by supporting the government's efforts in climate change risk monitoring and policy development for carbon sequestration. By establishing a Monitoring, Reporting, and Verification (MRV) mechanism for greenhouse gas emissions and carbon sinks in aquaculture, this project provides critical data on carbon sequestration in milkfish and sea bass farming. This information helps the government accurately assess carbon sinks, aligning with international net-zero emission trends and supporting Taiwan's domestic net-zero emission policy goals. The project contributes to informed decision-making and climate resilience strategies.

因我國尚未建立相符之監測、報告與驗證機制（MRV），國家溫室氣體排放清冊尚未建立濕地相關碳匯量數據，為了解我國整體之碳匯變動量及可減少之排放量，以及未來自願減量專案中所需之三大原則（可量測、可驗證、可報告）和五大特性（外加性、保守性、永久性、避免產生危害及避免重複計算），本案將針對養殖漁業碳匯，包含虱目魚及鱸魚養殖產業，進行水體及底土之溫室氣體與碳匯量測，。透過本案之執行，期望可精確的推估濕地的碳匯或碳源能力，以符合國際淨零排放趨勢及達到國內淨零排放政策目標。

永續影響力: 此計畫透過建立海岸濕地碳匯量測方法，提供本土基線數據，支持台灣 2050 淨零轉型，促進碳匯監測與減排策略的發展。

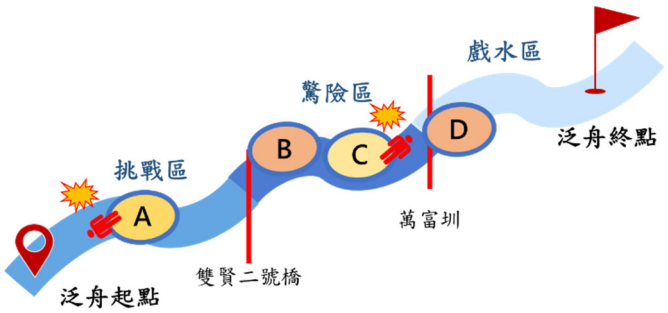
Evidence:
https://www.fa.gov.tw/view.php?theme=Press_release&subtheme=&id=1982

19. **Environmental carrying capacity assessment and opening planning of recreational resources in Annong River water area** 安農溪水域遊憩資源環境承載量評估與開放規劃

The development of Anong river has to adhere to the principles of sustainable development. Therefore, National Taiwan Ocean University was commissioned by Yilang County Government in 2022 to assess the water environment, resource conditions, and environmental carrying capacity of Anong river, in

order to develop suitable river segments for canoeing and determine the activity safety carrying capacity, which will serve as a basis for future management (p.12).
This study started from 2022. And it goes on till now. This report examines and analyzes the overall recreational environment of Anong river, including an inventory of recreational resources, environmental ecological sensitivity, recreational features, and safety regulations. It involves summarizing and analyzing data to propose plans for site categorization, recreational needs, and a sequence of recreational opportunities. Additionally, it outlines the management practices for opening recreational activities in the water area of Anong river, including visitor carrying capacity, facility carrying capacity, and ecological carrying capacity. It also involves collecting and analyzing data on activity regulation and monitoring mechanisms, and proposing recommendations.
The report suggests dividing the canoeing recreational area of Anong river into three segments: from the Lower Lake Bridge in Tianshan Village to Zhanggongwei Riverside Park, from Daguangmingzhen to the downstream Zhanggongwei Park, and from Yiyin Bridge to Nongyi Bridge. The area from the downstream of Lanyang Power Plant to the starting point of canoeing (Lower Lake Bridge in Tianshan Village) should be closed to recreational activities to avoid interference with the operation of the power plant.
Management and opening of any water recreational activities should be subject to rolling adjustments based on changing contexts. It is recommended that relevant management units consider the application of different technologies, the needs of stakeholders involved in water recreational activities, and incorporate diverse perspectives for adjusting management regulations (p. 12-13).
Sustainable Impact: aligns with SDG13.3.4 by providing crucial support to the Yilang County Government in monitoring and managing climate-related risks to the local environment. By assessing the river's ecological sensitivity, recreational resource conditions, and carrying capacity, this project helps inform sustainable management practices for recreational activities in the area. The data and recommendations offered ensure that the development of recreational resources aligns with environmental sustainability principles, supporting early warning systems, risk monitoring, and the protection of natural resources while ensuring safe and sustainable recreational use.

安農溪的發展需依循永續發展為目標。因此委託國立臺灣海洋大學針對安農溪水域環境、資源條件與環境承載量，研擬適合泛舟的河段水域及活動安全承載量，做為未來管理的依據。因此本報告針對新針對安農溪整體水域遊憩環境檢視與分析，含遊憩資源環境盤點、環境 生態敏感度、遊憩特色、遊憩安全規範等，透過檢視歸納分析及相關資 料之建立，並提出據點分類、遊憩需求及遊憩機會序列之規劃等。此外，也針對安農溪從事水域遊憩活動開放管理作法擬定(需含遊客承載量、設施承載量及生態承載量等)與遊憩活動的管制、監控機制等資料蒐集與分析，並提出建議方案。本報告建議將安農溪泛舟水域遊憩活動範圍分為三段，分別為天山村下湖橋至張公圍親水公園、大光明圳至下游張公圍公園、 及義隱橋至農藝橋河段，至於蘭陽發電廠下游 500 公尺至泛舟起點 （天山村下湖橋），為避免水域遊憩活動影響與干擾蘭陽發電廠運作，原則禁止從事水域遊憩活動。任何水域遊憩活動的管理與開放，都需配合不同時空背景進行滾動式修正，建議相關管理單位需考慮不同科技的應用、水域遊憩活動 相關利害關係者的需求，結合多元觀點進行相關管理規範的調整。
永續影響力： 此計畫評估安農溪水域的環境承載量，根據生態敏感性與安全規範開放適合的遊憩區域，促進可持續的水域管理與活動規劃，保護生態與資源。



Evidence:

https://www.e-land.gov.tw/News_Content.aspx?n=770C4B84956BD13B&sms=56708437A1C48D11&s=7B8D7CD10EC8E58C

20. **(Taiwan) national "Development and Application of Ocean Detection and Environmental Analysis Technology under Climate Change" integration plan** 執行國科會(NSTC)「鱸魚精準餵食及養殖環境監測與智能生產決策系統研究與開發 」計畫

1. The motor department team implements the "Research and Development of Bass Precision Feeding and Breeding Environment Monitoring and Intelligent Production Decision-making Systems" project. 2. This department provides relevant academic exchanges and lectures to allow our school and local personnel to obtain information professional education resources. 3. This department provides 30 special lectures on understanding electrical machinery, allowing participating students/personnel to have a general understanding of the professional knowledge of electrical machinery.1.電機系團隊執行「鱸魚精準餵食及養殖環境監測與智能生產決策系統研究與開發」計畫。2.本系提供相關學術交流與演講，讓本校及在地人員獲得資訊專業教育資源。 3.本系提供數 30 場認識電機專題演講，讓參與學生/人員對電機學習的專業知識有概括性的了解。

Evidence:

https://cse.ntou.edu.tw/var/file/63/1063/img/849864291.pdf

https://reurl.cc/yv2jDO (P2)

Environmental education collaborate with NGO Year: 2023

21. **The collaboration project between the The Longchen Sustainable Development and Environmental Protection Foundation and National Taiwan Ocean University.**財團法人榮成永續發展環保基金會與國立臺灣海洋大學合作案

The Longchen Sustainable Development and Environmental Protection Foundation (hereinafter referred to as Longchen P&P) aims to fulfill its corporate social responsibility by leveraging the marine research expertise of our university to promote various industry-academia collaboration projects. These efforts seek to achieve the goals of marine environmental protection and sustainable development. Sustainability is not achieved overnight; rather, it is a process of continuous improvement and energy

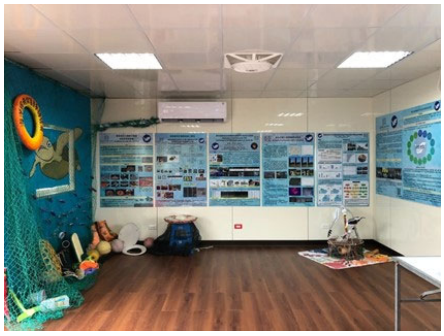
accumulation, gradually expanding the application of sustainable concepts. Based on this principle, each phase of this collaboration spans two years, and the partnership has now entered its third phase. Longchen P&P has invested nearly NT$20 million dollars, and the principal investigator has made significant contributions in academia, public education, and governmental support, yielding fruitful results across these areas.

Sustainable Impact: aligns with SDG13.3.5 by fostering environmental education and climate adaptation through NGO collaboration. This partnership focuses on marine environmental protection and sustainable development, integrating academic expertise and public education to raise awareness about sustainability. By collaborating with an NGO like Longchen P&P, the project promotes climate adaptation strategies and fosters long-term environmental stewardship. The partnership's multi-phase approach highlights continuous improvement in sustainable practices, contributing to both environmental protection and public awareness of climate issues.

財團法人榮成永續發展環保基金會(下稱榮成紙業)為發揮企業社會責任，結合本校海洋專業研究能力，推動各項產學合作計畫，以達海洋環境保護及永續發展之目的。

永續並非一蹴可幾，而是不斷改善並累積能量，逐步拓展永續概念的應用。基於前述原則，本合作案每兩年為一期，合作迄今已邁入第三期，榮成紙業共斥資近 2,000 萬，計畫主持人亦充分發揮所長，於學術、周邊團體教育及協助政府等方面均有豐碩成果。

永續影響力: 此合作計畫結合產學資源，透過海洋研究推動環境保護與永續發展，增進公眾教育與政府支持，促進可持續的海洋保護與社會責任實踐。



Evidence:

https://research.ntou.edu.tw/p/412-1021-10705.php?Lang=zh-tw

22. **The 15th Annual Conference on Development Studies「Sustainability: Climate Action, Just Transition and the Future of the Ocean」**第十五屆發展研究年會「永續：氣候行動、公正轉型與海洋的未來」國際學術研討會

The 15th Development Research Annual Conference, jointly organized by our center and the Taiwan Development Research Association, is titled "Sustainability: Climate Action, Just Transition, and the Future of the Ocean." This international academic seminar attracted over 300 participants from various sectors including academia, government, and industry, both domestically and internationally.

The conference covered important topics such as social science-driven net-zero transitions, sustainable ocean use, cultural heritage preservation in port cities, and climate action. It featured three exciting keynote speeches:

Dr. Lin Min-tsong, Vice Chair of the National Science and Technology Council, delivered a keynote

titled “From Ragnarok to Sustainable Value: Social Science-Driven Net-Zero Transition,” exploring the core values of technological development and the foundations of basic research and independent innovation technologies.

Professor Jiang Guoping, Convenor of the Taiwan Ocean Alliance and distinguished professor at the university, spoke on “Decoding the Tears of Mermaids: The Motivation Behind Blue Tears Research and University Social Responsibility,” sharing valuable experiences of university and local government collaboration in promoting scientific and humanistic development.

Research Fellow Leng Zegang from the Academia Sinica presented “Multilateral Governance under Geopolitics: A Case Study of Arctic Research,” examining the ongoing changes and challenges in Arctic governance and offering insights for political scholars.

The conference also featured an international forum, inviting scholars from Italy, India, Indonesia, Malaysia, and other countries to discuss sustainable ocean use, including strategies for fishing villages, observation, and urban regeneration. Additionally, there were two book launches:

“SDG14’s Addition, Subtraction, Multiplication, and Division: Sustainability Issues and Practices in Marine Ecology,” organized by Vice President Li Ming-an and edited by Professor Hsieh Yuling from the Center for General Education, with contributions from professors in various departments.

“The Fugue of Development: A Festschrift for Professor Wang Zhenhuan,” honoring Professor Wang Zhenhuan's contributions in the field of development research.

This conference, part of the 70th anniversary series of our institution, was a collaborative effort involving the Center for Social Responsibility and Sustainable Development, the Student Affairs Office, the Bachelor’s Program in Marine Cultural and Creative Design, the Bachelor’s Program in Marine Tourism Management, the Graduate Institute of Education, the Department of Environmental Biology and Fisheries Science, and the Smart Shipping Research Center. It aimed to serve as an academic platform for interdisciplinary, interdepartmental, and international cooperation, setting a new benchmark for cross-domain research in sustainable development.

President Hsu Tai-wen affirmed the conference’s success and emphasized Taiwan's outstanding achievements in areas such as social reform, human rights, COVID-19 pandemic prevention, green energy, marine technology, climate change, and the practice of university social responsibility as exemplifying “Taiwan Experience 3.0.”

The annual conference successfully provided a platform for exchange with 24 sessions and 80 paper presentations, allowing scholars, policymakers, and industry professionals from various fields to discuss sustainable development strategies and future directions, and laying a solid foundation for future cooperation and exchange.

Sustainable Impact: aligns with SDG13.3.5 by fostering collaboration with NGOs and international partners to promote climate adaptation and sustainability. The conference brought together over 300 participants from academia, government, and industry, facilitating discussions on key topics such as sustainable ocean use, net-zero transitions, and climate action. This event provided a platform for interdisciplinary and cross-national cooperation, highlighting the importance of NGO collaboration in addressing climate challenges and supporting just transitions toward sustainable development. Through these efforts, the conference contributed to global climate adaptation strategies.

本中心與台灣發展研究學會聯手共同主辦的「第十五屆發展研究年會-永續：氣候行動、公正轉

型與海洋的未來」國際學術研討會活動。

這項學術研討會活動吸引來自海內外的產官學界人士超過 300 人參與。會議的主題涵蓋社會科學驅動的淨零轉型、海洋永續利用、港口城市文化資產保護及氣候行動等重要議題，並安排三場精彩的主題演講。

本次邀請到國家科學及技術委員會副主任委員林敏聰發表「從諸神黃昏到永續價值--社會科學驅動的淨零轉型」演講，探討科技發展的核心價值及發展基礎研究與自主創新技術。第二場主題演講邀請臺灣海洋聯盟召集人暨該校特聘教授蔣國平以「解密人魚的眼淚-藍眼淚研究動機與大學社會責任」為題，分享大學與地方政府合作推動科學與人文發展的重要經驗。第三場主題演講則邀請中央研究院研究員冷則剛發表「地緣政治下的多邊治理：以北極研究為例」演講，探討以北極治理的持續與轉變為政治學者帶來進一步深思的課題。

亦安排一場國際論壇，邀請來自義大利、印度、印尼、馬來西亞等國學者共同討論海洋永續利用：漁村、觀測與都市再生策略等議題。另有兩場新書發表會，分別是由海洋大學副校長李明安總策劃，共同教育中心謝玉玲教授主編，集合生科院、海資院、工學院、人社院、共同教育中心教授群編寫的「SDG14 的加減乘除：海洋生態的永續議題與實踐」及國立政治大學前副校長王振寰名譽教授「發展的賦格：王振寰教授榮退紀念論文集」。會議期望通過國際論壇、主題演講、研究論文發表、新書發表及工作坊等多元方式，引領跨領域發展研究新風潮，共同研究如何減輕氣候變遷對海洋和社會的衝擊，以及如何實現公正轉型，確保永續的未來。

這次國際研討會為校慶 70 週年系列活動，由本中心攜手社會責任與永續發展中心、學生事務處、海洋文創設計產業學士學位學程、海洋觀光管理學士學位學程、教育研究所、環境生物與漁業科學系、智慧航運研究中心共同合作，期能成為跨領域跨單位及跨國合作的學術平台，為永續發展的跨域研究開啟新典範。本校許泰文校長亦在大會中予以肯定，並強調在面對全球永續發展的挑戰上，臺灣在社會改革、人權議題、新冠肺炎疫情防控、綠能建設、海洋科技、氣候變遷及實踐大學社會責任等領域的傑出成果，是「臺灣經驗 3.0」的展現。

這次年會成功地提供一個交流平台，共有 24 個場次，80 篇論文發表，讓來自不同領域的學者、政策制定者及產業界人士共同探討永續發展的策略與未來方向，並為未來的合作與交流奠定良好基礎。

永續影響力： 本次研討會促進跨領域、跨國合作，討論氣候行動、海洋永續利用與公平轉型，推動社會科學驅動的淨零轉型與海洋保護，為未來可持續發展奠定基礎。

Evidence:
http://tads.nccu.edu.tw/meeting/super_pages.php?ID=meeting101&Sn=29

SDG13.4 Commitment to carbon neutral university 實現碳中和大學的承諾

SDG 13.4.1 Commitment to carbon neutral university Year: 2023

23. Achievement of Carbon Neutral University

NTOU's carbon emissions can be divided into two primary Scope: Scope 1, direct emissions, such as the amount of fuel used for buses and heating boilers; and Scope 2, indirect emissions, such as the amount of electricity used on campus.

NTOU has set up a carbon reduction plan to achieve the goal of a carbon-neutral university. The methods of reduction include: reducing carbon dioxide production, for example, 1) cooperating with the government's Four Saves Program (saving electricity, water, oil, and paper), and 2) improving energy efficiency (using energy-saving labeled products, energy-efficient air conditioners, energy-saving light bulbs, and applying for green building and intelligent building labels). In addition, taking advantage of NTOU's geographical location near the mountains and the sea, we have installed solar power equipment in the parking lot and started the carbon reduction projects of campus forestation (large trees) and sea forestation (large seaweed). According to the calculation, NTOU has made a commitment of carbon neutrality by 2050. On the other hand, NTOU's "NTU Rainwater Park" and "Longgang Ecological Park" have been certified as environmental education facilities by the Environmental Protection Agency. These are promoting ecological education and integrating environmental education on campus into community life to achieve sustainable development and help improve the deteriorating environment. In the future, we plan to build a beach on Beining Road to turn the university into a forest and seascape campus.

Sustainable Impact: NTOU is actively pursuing carbon neutrality by implementing strategies to reduce both direct and indirect emissions. The university focuses on energy efficiency improvements, renewable energy use (solar power), and campus reforestation. These efforts align with Taiwan's commitment to carbon neutrality by 2050, while promoting environmental education through certified facilities and community outreach.

永續影響力: 致力於實現碳中和，透過節能減碳、太陽能設置與綠化計畫，達成 2050 年碳中和目標。並結合環境教育與社區生活，促進永續發展與生態保護。

Evidence: https://mprp.ntou.edu.tw/p/16-1017-75433.php?Lang=zh-tw

24. SDG13.4.2 Indicator: Achieve by date 2050