



A Gleam of Hope for Wetlands

—泓清池 一線生機

邱文彥教授談台灣濕地

A Talk by Prof. Wen-yan Chiau, on Wetlands in Taiwan

2008年，
西班牙籍觀念藝術家拉拉·阿瑪雀紀來台參加台北雙年展
曾經驚喜地指著一塊淡水河口的沙洲，想為它作畫。
一塊無名的小沙洲，在國際級藝術家眼中，
竟勝過世界級美景……

The Spanish conceptual artist Lara Almarcegui came to Taiwan for the 2008 Taipei Biennial. Inspired by a sandbar of the Danshui River estuary, she wanted to make a drawing of it. To this internationally acclaimed artist, such sandbar is more beautiful than any other world-class scenery.

在地狹人稠的台灣，四面環海，寸土寸金，雜草叢生、人煙罕至的溼地，怎能與拔地而起的高樓、產值驚人的工業園區相比擬？溼地是什麼？到底對人類有些什麼影響？貌不驚人的溼地有那麼重要嗎？值得這麼多專家學者為它大力奔走、請命？

根據1997年英國《自然》雜誌報導，全球生態系統每年的生產價值是33兆美元，其中全球溼地系統價值是每年14.9兆美元。2002年，拉姆薩會議更評估，溼地每年的生產價值可達15兆美元。溼地與森林、海洋並稱為全球3大生態系統，水生及陸地生態系最豐富多元的過渡地帶；由於溼地同時具備陸地和水生生態系的特點，所以堪稱世界上生產力最高的地區之一。

長久以來，溼地因為開發用地取得不易等因素，往往成為都市計劃中的犧牲品，在地球暖化題日益嚴重後，人們終於正視溼地的重要性，開始加強溼地營造與復育。重點是，溼地要如何營造？又如何復育？有什麼具體的理論基礎？在台灣這座最爾小島上，留下溼地、營造溼地，會比蓋大樓大廈、規劃工業區重要嗎？

邱文彥教授曾任國立海洋大學海洋資源管理研究所教授兼所長、現任環保署政務副署長，他關注海洋相關事務，在其逾25年規劃和保育的專業生涯中，擔任過許多研究計畫主持人，並參與政府機關多項委員會事務。談到溼地，邱副署長有一籬筐的故事，能和我分享。

「在談論溼地的重要性之前，要先知道什麼叫做溼地。」邱文彥副署長表示。

聯合國對溼地的定義相當廣泛，根據國際拉姆薩公約，溼地包括河川、水庫、魚塢、高山湖泊等等，人工與自然形成的都算溼地，甚至水深6公尺以內的淺海域也算是溼地。而在台灣，最早廣泛討論溼地概念、最早劃出溼地範圍的，是中華民國野鳥學會，把範圍劃出來不僅管理有效，也方便進行檢討。數年前，邱副署長擔任溼地保護聯盟理事長時、也擔任行政院「國家永續發展委員會」委員，他提議政府應著手進行全國溼地調查，並將調查範圍擴大至珊瑚礁。這項建議獲得支持，並納入國家永續發展行動計劃中，才促成了今天75處國家重要溼地的劃設。

Surrounded by sea, Taiwan is densely populated and its land is expensive. How can wetlands with weeds and few visitors compete with science parks that generate high production values? What is a wetland and what impact does it have? Does its importance justify the lobbying for its conservation by so many experts and scholars?

In 1997, Nature reported that the annual production value of the global ecosystem is 33 trillion dollars, with 14.9 trillion from wetlands. The 2002 Ramsar Convention put the share at 15 trillion dollars. Wetlands, forests and the ocean are 3 major ecosystems of the globe, whereas aquatic and terrestrial ecosystems are the most diversified. Integrating the advantages of both systems, wetlands are the most productive areas on earth.

Over the years, difficulty in acquiring land for development has made wetlands victims of urban planning. Now, as global warming intensifies, people start to conserve wetlands. But how is that done? Is conservation in Taiwan more important than building hi-rises or designating industrial areas?

Mr. Chiau was a professor and Director in the Institute of Marine Affairs and Resource Management at National Taiwan Ocean University, and is now Deputy Minister of the EPA. During his career of over 25 years in planning and marine conservation, he was the manager of many research projects and took part in many government affairs. He has a lot to say about wetlands. "Before we talk about its importance, we must first define it." said Chiau.

According to the Ramsar Convention, wetlands include rivers, reservoirs, fish farms, mountain lakes — natural or manmade, and shallow waters of 6 m in depth. In Taiwan, it was the Chinese Wild Bird Federation that first raised the discussion on wetlands and designated wetlands for better management and review. Many years ago when Chiau was the chairman of Wetlands Taiwan, he was also a member to the National Council for Sustainable Development Network. He proposed a national survey on wetlands and coral reefs, which was added to the sustainable development action plan and gave rise to the designation of 75 national wetlands.

挖土機下搶回水雉天堂

「在我投入溼地保育的歷程中，有兩件事讓我永生難忘，一個是高雄市洲仔溼地水雉返鄉計劃，一個是彰化縣溼地。」位於高雄繁榮市中心的洲仔溼地，多年來一直規劃為民俗文化園區的預定地，但遲未開發，荒廢多年。但不說許多人或許不知道，在1865年，英國博物學家史溫侯在高雄大水塘採集到第一筆水雉紀錄，此為台灣水雉正式紀錄的開始。

「這一片『大水塘』的沼澤區，包括現在的澄清湖、鳥松、蓮池潭等地，都曾是一片原始的沼澤。我曾看過一張老照片，一個外國人划著船，划進溼地，任誰都難以想像，現在的高雄繁榮熱鬧、高樓林立、車水馬龍的原址，以前居然曾經是宛如亞馬遜叢林的沼澤區。」

當時邱副署長以溼盟理事長身分，拜會高雄市政府工務局長林欽榮先生，希望他給溼盟五年認養時間嘗試打造水雉棲地。多次溝通後，高雄市政府終於同意，讓溼盟的學者、志工投身保育行列，令人感動的是，在一旁默默紀錄這一切的志工謝紀恩，在當年還是個國中生，課後就來溼地陪著大家，到現在已經是升高中了，他依舊是年紀最小的志工。

未竟之責 戮力以赴

一年九個月後，水雉逐漸返鄉，在洲仔溼地安身立命，孕育下一代，然而，溼地保育不光是從開發的巨輪下搶救下來就算大功告成，之後的維護更為重要。以洲仔溼地為

Newfound Heaven for Jacanas

“I have found two things unforgettable: the Revival of Jacana in Kaohsiung's Jhouzih Wetland Park and the Fubow Wetland in Changhua County. Jhouzih Wetland in downtown Kaohsiung has long been reserved for a cultural park but the construction never started. In fact, in 1865 the British naturalist Robert Swinhoe discovered traces of jacanas in a swamp in Kaohsiung, and initiated the tracking of this bird.

Chengching Lake, Niaosong and the Lotus Pond were once swamps. I saw a picture of a foreigner rowing a boat in the wetland. It's hard to imagine part of the bustling city was once a swamp akin to the Amazon rainforest.”

The then-chairman of Wetlands Taiwan, Chiau asked Chief of the Public Works Bureau of Kaohsiung, Mr. Chin-Rong Lin, for 5 years' time to build a jacana habitat. After numerous rounds of talks, the City Government approved of such attempt. Back then a junior high school boy, Ji-en Xie, volunteered to come after school to accompany everyone and record the progress. Though now in senior high, Xie is still the youngest volunteer, and his dedication touched me the most.

Dedicated to the Unfinished Work

21 months later, the jacanas started to build habitats and breed in Jhouzih Wetland, but the work was not

yet completed. It required NT\$ 800-900 thousand annually for the subsequent conservation of the wetlands. But the budget was a big problem.

「於是，我帶著學生們製作簡報，參加『福特環保獎』，幸運得到2003年的首獎，獲得獎金100萬，於是，一年的保育經費有了著落！」邱副署長帶著微笑說道。

然而，溼地保育不是談一個點就行，要有一個「廊道」的觀念，像洲仔溼地的水雉，會從台南官田飛到高雄洲仔，鳥兒不會只待一個地方，因此，溼地的保育得要有全面性的概念。營建署目前規劃出75處「國家重要溼地」，是由邱副署長任現勘召集人，由多位學者專家經過實地野外勘查，一處處去評估、規劃出來的。其中台南縣的四草溼地及七股溼地，被評定為「國際級」的溼地，其生態資源之豐富，可見一斑。

「當然，台灣珍貴的溼地不只這75處，但要土地納入國家重要溼地保護範圍，卻不是人人都贊同。」

讓邱副署長最惋惜的，便是彰化縣的福實、大城等溼地未畫入範圍內。尤其大城溼地可能是國光石化的預定地，前景岌岌可危。當時地方人士不願將彰化沿海納入國家重要溼地，於是發動包圍抗議，由於未獲居民同意，福實、大城等溼地只能歸列為「待定溼地」，尚未列入國家重要溼地之列，成為遺珠之憾。事實上，聯合國對於溼地保育強調「明智利用」，亦即船照走、魚照抓、塆照養，重點在如何能永續合理地利用溼地。

國際藝術家的感動

「比起崇山峻嶺、碧海白沙，溼地的美或許是低調、內斂的，但她寧靜的氛圍、涵養生物的包容，是無與倫比的美麗。」

2008台北雙年展，西班牙籍觀念藝術家拉拉·阿瑪雀紀應邀來台參展，阿瑪雀紀對城市裡的荒地或廢棄將被拆毀的空間特別喜愛，常常到一個新環境時，就不自覺地搜尋這些地點，那次來台北，她就自北至南看了很多荒地與棄置空間，她揹著大背包，帶著地圖、騎著腳踏車循線尋找，是她認識這個城市的方式之一。

“I took the students to participate in a contest organized by Ford and won the first prize and NT\$ 1 million, which we used for the wetland conservation.” said Chiau smilingly.

But wetland conservation involves more than a single spot, but a “corridor”. Jacanas in Jhouzih, for instance, are originally from Guantian Township in Tainan, meaning they stay in more than one place. Thus wetland conservation has to be holistic. Currently, the Construction and Planning Agency identifies 75 “wetlands of national importance” under a project convened by Chiau, with input from scholars and experts. In particular, Sihcao Wetland and Cigu Wetland in Tainan County are classified as of international importance, showing their ecological richness.

“We certainly have more than 75 precious wetlands, but it's hard to get everyone to agree to list them all as of national importance”

What is most regrettable to Chiau was the failure to include Fubow Wetland and Dachang Wetland in Changhua County. The latter might be reserved for the Kuo Kuang Petrochemical Park, plus the locals protested against the idea of listing Changhua coastal area as important wetlands. Therefore, the place was still on the waiting list. In fact, the United Nations places an emphasis on the wise use of wetlands, stressing on sustainable development.

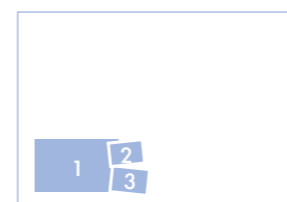
Touching the Heart of Almarcegui

Unlike mountains and oceans, wetlands are more “reserved”, but their quietness and tolerance are definitely unequalled.

The Spanish artist Almarcegui came to Taiwan for the 2008 Taipei Biennial and

was drawn by the urban wasteland, deserted and demolished areas. When she is in a new environment, she tends to search for such places in her own way — with a large backpack, a bike and a map.

She said new things and old things coexist in Taipei,



1. 高雄洲仔溼地曾是水雉的故鄉 / 黃亮唯攝
Jhouzih Wetland used to be a hometown of jacanas. / by Liang-wei Huang
- 2-3. 溼地內有豐富多元的生態系統，肩負著教育下一代的重要意義 / 陳德鴻攝
Wetlands are rich ecosystems that are important to the education of the next generations. / by De-hong Chen



她說，台北有很多新與舊的東西都並存在城市裡。與城市互動的過程中，為她帶來創作上的靈感。尤其喜歡那些在淡水河岸間，被綠色植物覆蓋的沙洲、崎零地。

「她曾經驚喜地指著一塊淡水河口的沙洲，問起那塊地有無名字。在場陪同的人都說不出來，一塊無名的小沙洲，在黃昏時分、夕陽映照的景致，在國際級藝術家眼中竟勝過世界級美景。」

為了回應阿瑪雀紀對於中興橋畔沙洲的關切，邱副署長遂建議營建署擴大「大漢新店溼地」的範圍，以保護該一沙洲。

近年來保育意識逐漸抬頭，溼地的功能也漸漸被人認同，而人工溼地的概念除了維持生物多樣性、生態系統服務功能，還有漁業資源、防洪，廢水過濾及吸附多方面的作用。有鑑於此，邱副署長赴加拿大參訪期間，對人工溼地特別深入了解，返國後即大力推動。他認為，溼地生態系可作為營養鹽降低及碳的貯存處，因此能將許多傳統廢水中的污染物，大為消滅。傳統的廢水處理程序得設計大量又複雜的管線，地面建築或混凝土結構造成環境負擔，人工溼地則能省去這些麻煩，並且還有景觀價值，變成生態池、景觀池。

and her interaction with the city offered her inspiration. She particularly liked the sandbars and fields with irregular boundaries covered by green plants in Danshui riverbank.

“She was amazed at a sandbar and asked for its name, which nobody there knew. It was amazing that at sunset, such unknown sandbar could captivate her.”

In response to Almarcegui's concern for the sandbar, Chiau proposed to the CPAMI to extend the area of Dahan-Sindian Wetland to better protect it.

Nowadays people are more aware of environmental protection and understand the functions of wetlands, which include maintaining biodiversity, serving the ecosystem, offering fishing resources, flood prevention and sewage treatment. In view of this, after his study on constructed wetlands during his visit to Canada, Chiau promoted the concept of such wetlands, believing that wetland ecosystems can cut nutrient salt and store carbon, hence decreasing pollutants in sewage. The construction of conventional sewage disposal process involves complicated pipes and causes environmental damage, but constructed wetlands spare such trouble and can be sightseeing spots.

「所以，人口越是稠密的地區，越有必要與溼地共存，不只要保護自然溼地，也要造出人工溼地。在日本，許多像是網球場等空地設計成下凹狀，暴雨來臨時成為自然池，洪水不會流到大街上，這是氣候變遷時代都市防災的新思維。」邱副署長如是說。

抵擋氣候變遷的幫手

此外，面對日益嚴重的全球氣候變遷，溼地亦能解決部分問題。例如，溼地還有碳匯功能，能進行碳的調節。溼地由於其特殊的生態特性，在植物生長、促淤造陸等生態過程中，積累了大量的無機碳和有機碳，由於溼地環境中微生物活動弱，土壤吸收和釋放二氧化碳緩慢，形成了富含有機質的溼地土壤和泥炭層，有固定碳的作用。如果溼地遭到破壞，溼地固定碳的功能將大大減弱或消失，溼地將由「碳匯」變成「碳源」，對全球氣候將產生重大影響。科學家研究指出，溼地固定了陸地生物圈35%的碳，總量為770億噸，是溫帶森林的5倍，同面積的紅樹林沼澤溼地，所固定的碳是熱帶雨林的10倍。

邱副署長亦指出，有些居民反對溼地的原因，是因為擔心禽流感。這些遠從千里而來的候鳥可能是感染源。「禽流感爆發時，候鳥成為千夫所指，大家認為鳥會帶病菌，那麼，把溼地填平，禽流感的威脅就消失了嗎？這是極度謬誤的觀念。根據拉姆薩公約秘書處的報告，自然溼地被破壞，候鳥沒地方去，被迫到禽畜飼養場所共同覓食，這樣才會把病菌帶進你我生活環境中。」邱副署長語重心長的表示，保護溼地實則保護民衆的健康。

在過去的時空背景，台灣不僅是對溼地的定義不甚明確，也沒有適當法令可以依據。例如1980年代，僅有沿海地區自然保護環境綱領作為保護溼地的法令依據，勉強可讓溼地避免被填掉、鯨吞蠶食的命運。然而在法源嚴

“Hence the more populous the area, the higher its need to protect and coexist with wetlands. In Japan, many tennis courts are concaved so when there is heavy rain the water won't flood to the streets. This is a brand new thinking in the age of climate change.” said Chiau.

Fighting Climate Change

Wetlands can be part of the solution to climate change. For instance, carbon sink can adjust carbon density. Due to its unique characteristics, a wetland can accumulate lots of inorganic and organic carbon, and its organic-rich soils and peat can fix carbon. If damaged, a wetland may change from a carbon sink to a carbon producer and impacts the climate. Scientists indicate that wetlands fix 77 billion tons, or 35% of the carbon produced by land species, 5 times that of the temperate forest. Mangrove swamps of the same land area fix carbon 10 times that of tropical forests.

Chiau also stated that some opposition to wetlands is due to concerns over the avian flu carried by migratory birds flying from afar. “When avian flu erupted, people blamed migratory birds. But is the threat to go away if wetlands are filled? This is an incorrect mindset. Ramsar Convention reports that if wetlands are destroyed, migratory birds will have to fly to livestock area in search for food, which in turn spread germs.” Chiau said solemnly, “protecting wetlands actually means protecting people's health.”

In Taiwan, the definition of wetlands used to be vague and without legal basis. In 1980, there was only the “Guidelines For the Protection of Coastal Areas” to save wetlands from being filled. However, without a legal basis, both the government and the citizens have



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1. 四面環海的台灣，擁有豐沛多樣的溼地生態，是活的自然教室 / 陳德鴻攝
Surrounded by sea, Taiwan has very rich and varied wetlands. / by De-hong Chen

2-3. 溼地保育志工，努力不遺餘力，右圖為放樣定樁完成照 / 陳德鴻攝
Volunteers spare no efforts to protect wetlands. / by De-hong Chen

2

3



重不足的情況下，無論是政府還是民間，要從事溼地的保育，都得花費一番心思。

「營建署成立海洋國家公園管理處，其過程歷經千辛萬苦，終於讓台灣地區珍貴的海洋資源，能名正言順地受到保護。不久將來台江黑水溝國家公園正式成立，對於溼地保育不啻為新里程碑。」

喜歡研究古地圖的邱副署長，辦公室牆上就掛著一張日據時代古地圖複本，他說，台灣西南海岸有鯨魚，像七股潟湖台江內海那片沙洲七鯤鯓在老一輩人的口中，台語稱做「海翁窟」，意即鯨豚出沒之處。

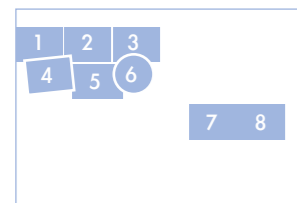
「把台灣橫著看，魚眼就是首善之區台北市，背鰭是花東地區，而最肥沃的魚腹就是嘉南平原，是不是很傳神呢？」邱副署長幽默的說。

to work much harder to conserve wetlands.

CPAMI established Marine National Park Headquarters to protect Taiwan's precious marine resources, and the establishment of Taiwan's eighth national park will be a milestone for Taiwan's wetland conservation.

Chiau likes to study antique maps. He said there are whales in the southwest coast of Taiwan. For instance, in Taiwanese, the Qikuni sandbar in Chiku Lagoon, means places where whales and dolphins appear.

“If you see Taiwan island as a fish, Taipei City is the fish eye, Hualien and Taitong areas are its back fin, and the Chianan Plain is its belly, isn't this metaphor vivid?” said Chiau.



- 1-3. 溼地植物。由左至右分別為泥碳蘚、連翹穀精草及野菱 / 陳德鴻攝
Wetland plants (from left to right): Sphagnum moss, *Eriocaulon buergerianum* Koern., and *Trapa bispinosa* Roxb. var. *iinumai* Nakano. / by De-hong Chen
- 4-6. 溼地動物。由左至右分別為台北樹蛙、雄性小紅蜻蜓及短指和尚蟹 / 陳德鴻攝
Wetland animals (from left to right): Taipei Green Tree Frog (*Rhacophorus taipeianus*), male Scarlet Dwarf (*Nannophya pygmaea*), and Soldier Crab (*Mictyris brevidactylus*). / by De-hong Chen
- 7-8. 在聯合國的溼地定義下，河川與海灘也屬溼地範圍 / 陳德鴻攝
Under the definition of the U.N., rivers and beaches are also part of wetlands. / by De-hong Chen

而位於「魚腹」的台江內海，如今在地方與政府積極推動下，將要晉升為台江黑水溝國家公園，是個令人振奮與欣喜的好消息。

「台江內海原本是濱南工業區預定地，我曾在聯合報發表過一篇文章，標題大喇喇地寫著——濱南工業區？南濱國家風景區？兩個截然不同的名詞，掛上兩個大問號，人們很難抉擇嗎？是要開發帶動繁榮的工業區，還是為孩子留住青山綠水？」所幸，今天雲嘉南大片溼地已納入國家風景區的範圍，至少保住了大片生機。

「我家門前有小河，後面有山坡……」這首歌人人聽過。但生活在都市叢林的孩子們，腦海中是否能隨著歌詞浮現出畫面？那條小河、那片青山，是否仍在？溼地不若宏偉山系、玄妙地景那樣引人矚目，也不是羅馬萬神殿、印度泰姬瑪哈陵那般氣勢恢弘的世界遺產，它只是一泓幽靜的池水、水草蔓生，泥地肥沃，為飛羽、蛙類、昆蟲營造的家園。希望在全球重視環保生態的風潮中，台灣能加緊腳步，友善對待這宛如綠色鑽石的溼地。

「我相信，這改變是指日可待的！」邱副署長臉上帶著自信與希望的笑意。

Thanks to the effort by local and central governments, the “belly”, Tai-Jiang Inner Sea, will soon be a national park, which is exciting news.

“Tai-Jiang Inner Sea was once reserved for Pin-Nan Industrial Area. I wrote an article on the United Daily with such title: *Pin-Nan Industrial Area? Or Nan-Pin National Scenic Area?* Through this I tried to ask what people really want.” Luckily, many wetlands in central Taiwan have been included as national scenic areas.

In Taiwan a well-known nursery rhyme describes the beauty of the rural area, but it may be difficult for city-dwelling children to imagine the scene. A wetland is not like magnificent mountains, the world heritage of the Pantheon in Rome, or the Taj Mahal in India. Home to birds, frogs and insects, it is just a swamp with weeds and rich soil. It is hoped that Taiwan can catch up with other countries in conserving the ecosystem and cherishing the precious wetlands.

“I believe that we can expect such change to take place!” said Chiau with confidence and hope.



邱文彥教授簡介 Profile of Prof. Wen-yan Chiau

擁有美國賓夕法尼亞大學都市與區域規劃博士學位的邱文彥副署長，曾任國立海洋大學海洋資源管理研究所教授兼所長、中華民國溼地聯盟理事長、總統府國土保育及開發諮詢委員會委員、行政院國家永續發展委員會委員。其專長為環境規劃與管理，尤其關注於海岸管理、溼地保育、海岸觀光遊憩、海洋文化資產、海洋事務與環境法等領域。其擔任過許多研究計畫主持人，曾參與政府機關多項委員會事務，協助修訂多項相關法案，負責研擬整體海岸管理計畫及多項海洋政策，並參與 APEC 海洋保育工作組事務十餘年。

With a Ph.D. degree in environmental planning and management from the University of Pennsylvania, Chiau was a professor and director in the Institute of Marine Affairs and Resource Management at NTOU, President of Wetlands Taiwan, an advisor for the “Advisory Commission on National Land Conservation and Development to the Presidential Hall” and the “National Council on Sustainable Development of the Executive Yuan”. His expertise lies in environmental planning and management, especially in coastal zone management, wetland conservation, coastal tourism, underwater heritage, oceans policy and environmental law. He also served as project manager and principal advisor on a wide range of projects related to the marine environment.

