

Lung-sheng Chang on Taiwan's Environmental Conservation from Cases Abroad

張隆盛 從國際看台灣保育之路

面對真相 讓世界因你而不同

Face the Truth and Make a Difference

《世界又熱又平又擠》一書作者佛里曼指出，世界面臨一場劃時代的綠能革命，未來50年，綠能革命將決定一個國家的經濟地位、環境健康、能源保障以及國家安全，也關係個人及企業的生存能力……台灣呢？為這場革命做了哪些準備……

Thomas Friedman pointed out in his book *Hot, Flat and Crowded* that the green revolution happening right now around the world will decide, in the next 50 years, for a nation its economic status, environment health, energy protection and national security, as well as the viability of individuals and businesses. What has been Taiwan's preparation for it?

台灣被世界銀行視為水災、旱災和地震等三大災害交替發生率最高的區域之一。「台灣地處板塊運動活躍帶、又是颱風路徑必經之地，這些條件是與生俱來的。然而，台灣之所以這麼美，就是因為承受了這些洗禮。」張隆盛教授緩緩說道。

「把地震颱風這些自然現象稱為『災難』，是因為人命財產受到損害。沒人居住的自然環境，颱風帶來雨水、泥流翻起沃土、地震崩塌造成灘地、平原……這些都是自然界生生不息的必要條件，只不過，當這些自然現象發生在人類生活的區域，就變成了天災。」

前營建署署長、現任牽成永續發展文教基金會董事長張隆盛表示，人類毋需將氣候異常視作大自然給的譴責。距今最近的小冰河時期發生在15世紀中葉，在加拿大、北美、歐洲等地留下了冰河時期的冰川、冰壺等特殊地景。根據史籍記載，當時歐美飽受惡劣天候所苦，農作收成及漁獲量皆明顯下降，歐洲、北大西洋沿岸頻頻遭受風暴侵襲，洪水不斷發生。

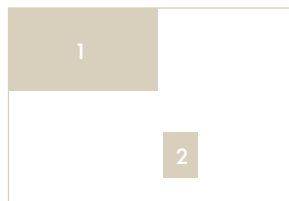
「由此可推斷，地球溫度改變是自然循環，只不過當時全球人口少，可以遷徙至宜居之地，但現在人口稠密，移居談何容易？為此甚至有專家預言，氣候問題可能會導致戰爭發生。」

也許，這樣的科學論點會讓人覺得沮喪，彷彿不管人類怎麼努力，都無法改變命運。但張前署長亦說到，比起中古世紀，現在的科技、資訊發達，能降低災難所帶來的衝擊。「人類需懂得趨吉避凶之道，不單是了解生命財產是否安全，也應明白在土地上興建的建築、種植的作物跟土地的關係，再以科技來延緩暖化的速度，學習以自然的角度的思考，而非用人類的看法強作改變。」

國家公園淨土 留下永續生機

近年來，國際上幾次因氣候引發的災難，終於讓人類走出自私自利的本位主義，從戰勝自然的傲慢，轉為與自然共處的謙卑。

以台灣為例。1970年代間，為振興產業及經濟發



1. 能為地球留下永續生機的不會是工業與高科技，而是最簡單平凡的護育森林、涵養土壤 / 陽管處提供，蔡東欽攝
What provides sustainability for life is neither industrial development nor high technology, but forestation and soil retention. / Photo provided by YMSNP, taken by Dong-qin Cai
2. 張前署長指出，面對氣候變異人類不僅需懂得趨吉避凶，還需了解與自然的關係 / 黃志浩攝
Chang stated that facing climate change, people need to learn how to avoid dangers and understand the human-Nature relationship. / by Chi-hao Huang

According to the World Bank, Taiwan has the highest rate of alternate occurrences of floods, droughts, and earthquakes. "Taiwan is located in an active tectonic zone and where typhoons are sure to pass through. These are the island's natural conditions; yet they are also the reason why Taiwan is so beautiful," Prof. Lung-sheng Chang said slowly.

"Earthquakes and typhoons have been regarded as disasters because they cost people's lives and property damages. In a natural environment with no residents, typhoons bring rain, mudslides unearth fertile soil, and earthquakes and landslides result in beaches and plains. They are the requirements of Nature's regeneration, but become disasters when happening in areas where humans live."

As former director-general of CPAMI and current chairman of Chien-Chen Sustainable Development Foundation, Chang stated that climate anomalies are not a condemnation from the nature. The Little Ice Age (LIA) in the mid 15th century caused glaciers and lagoons in Canada, North America, and Europe. Records show that the LIA's severe weathers in those regions cost significant decrease of harvests and fish catch volumes, and Europe and the North Atlantic coast were frequently hit by storms and floods.

"The earth's temperature change is a natural cycle, but the world's population was small then, and people could move to habitable places. Now with dense population worldwide, migration has become truly difficult. Some experts even predicted that the climate issue might even lead to wars."

Such a scientific viewpoint is depressing as if it is useless for people to make efforts to change the fate. Yet, Chang also said that, compared to medieval period, modern advancement in information and technologies can reduce the impact of disasters. "People need to learn how to avoid dangers not just to ensure the safety of lives and property but also to understand the relationship among buildings, crops and the land. People then can use science and technology to slow down global warming and learn to think from the perspective of Nature, rather than enforcing changes from human's view."

National Parks: Sanctuaries for Life Sustainability

Due to climate-induced disasters in recent years, international communities finally dumped their selfish egocentric, arrogant attitude toward nature and became humble to coexist with Nature.



從冰河遺跡推論，地球溫度改變是自然循環，只是在人口爆漲、汙染加劇的現今變得更嚴重。圖為諾米爾的海峽美景 / 張隆盛攝
Iceland boasts it can be assumed from the glacier remains that changes in the Earth's temperature has been a natural cycle, but the human population explosion and pollutions have aggravated such changes. The photo was taken in Newmyer Channel. / by Lung-sheng Chang

展，擊劃如十大建設等重要發展計畫，展開填海造陸、鑿山鋪路的大工程，當時想要推行環境永續、生態保育的概念並不容易。在許多保育先賢大力奔走下，1982年，台灣終於有了第一座國家公園——墾丁國家公園，26年來，陸陸續續建置了7座國家公園，而第8座台江國家公園也已成立，國家公園總面積達國土面積的8.65%。

「26年前，沒人談論氣候變遷、沒人在意土石流，也沒人重視環境保育。一群催生國家公園、推動生態保育浪潮的先賢，被視作經濟發展的阻力，致使國家公園的擘畫推展起頭艱辛。26年後，地球環境丕變，人類飽受無情氣候所帶來的災禍之苦。這時保留了青山綠水、顧全了自然環境的台灣國家公園，成了最珍貴的綠色資源，也是國土永續完整的最後生機。」

只是，為了將珍貴自然資源劃入國家公園範圍，受到最完善的保護，張前署長不惜得罪建商財團，和林務農政體系斡旋，阻擋打算建於七星山頂的氣象雷達站、攔下橫越野生動物樂土的新中橫公路、協調終止國家公園區域內礦區採礦權、使政府撤銷立霧溪電廠計畫……他的不懈努力換來了「國家公園之父」的美名，對此，張前署長倒很謙虛。

「這封號我不敢當，參與台灣國家公園的推動擊劃，只是一個從小在東勢長大的孩子，將個人對山林的熱情轉為大愛罷了！」

During the 1960s and 1970s in Taiwan, the government planned the Ten Major Construction Projects to upgrade the industry and the development of the country. It was hard to promote environmental sustainability and conservation when all the massive building projects were in progress. With the enormous efforts of environmental protection groups, the first national park in Taiwan, Kenting NP, was established in 1984. Since then, the island has had 7 NPs, and the 8th one, Taijiang NP, will be set up recently. Terrestrial area of all NPs is about 8.65% of Taiwan's land.

"26 years ago no one talked about climate change or cared about mudslides or environmental conservation. Eco-activist groups were seen as roadblocks to economic development, and the establishment of NPs was hard. Now the Earth's conditions have severely changed and people suffer greatly from climate-induced disasters. Therefore, Taiwan's national parks, with their preserved mountains and natural environment, have become the most precious green resources and the final hope for the sustainability of national land.

To include precious natural resources into NPs with comprehensive protection, Chang had disgruntled business groups, and negotiated with the forestry/agriculture agencies as he stopped them from putting a weather radar on the top of Mt. Cising, from building the New Central Cross-Island Highway which would have cut through the wildlife paradise, from mining inside the NPs, and from building a power plant at Liwu River. His relentless efforts won him the title "the father of Taiwan's National Parks," which Chang has been humble about.

"I'm truly flattered. My involvement in promoting Taiwan's national parks was just extending my love for mountains and forests since childhood in Dongshih to a greater scale."

過好日子 非得在經濟上加碼？

致力於環保議題的張前署長，足跡行遍全球，甚至遠赴南極兩次、北極三次，用相機留下極地珍貴畫面帶回台灣，感動許多人。

看盡珍稀美景，他語重心長的說，人類所追求的「好日子」究竟是甚麼？住豪宅、開名車才叫過好日子嗎？經濟發展只是一時的，人類世代安居樂業才是永遠的。他特別舉了冰島和不丹的例子，做為借鏡。

而曾被譽為人間天堂的冰島，這座遺世獨立的島嶼上擁有冰河和凍原，境內遍布活火山、間歇泉、熔岩沙漠，冰與火在此共存共榮，是渾然天成的地理教室。冰島人靠得天獨厚的環境發展出漁業、觀光產業，加上豐富的地熱資源提供乾淨低廉的能源，國民所得高達6萬美元，人人擁有高學歷、優質社會福利與生活環境，富有又長壽的生活令人稱羨。

然而，2008年的席捲全球金融風暴重創冰島，天堂一夕變色，三家銀行倒閉後由政府接管，這些銀行的負債竟是冰島140億歐元的國內生產總值（GDP）的9倍，冰島面臨破產危機。面對經濟困境的冰島，把腦筋動到自然資源上，運用低廉的地熱，吸引美國鋁業在境內大規模設廠，此舉引發兩極化評價，陷入極大爭議，有學者憂心，在金融風暴中崩壞的冰島，又要燒熔於鋁業熔爐中。而冰島人也認為比起經濟發展，大家更擔心的是自然美景會不會毀於一旦，讓冰島成為鋁冶煉業的犧牲品。



足跡遍布全球的張前署長，曾多次造訪南北極，對暖化造成的影響，感受頗深 / 張隆盛提供
Chang, former Director-general of CPAMI, paid numerous visits to the South Pole and the North Pole. He is particularly concerned about the impact of global warming. / Photo provided by Lung-sheng Chang

Better Life Better Economy?

Chang had traveled around the world and visited the South Pole twice and the North Pole three times. With his camera, he brought precious scenery in the polar regions back to Taiwan.

He was earnest to ask: what exactly does the so-called "good life" means? Does it mean living in expensive mansions and driving luxury cars? Economic development is only temporary. That people can live in peace forever is the eternal goal for humans. Chang used Iceland and Bhutan as examples for his point.

Iceland, once hailed as a paradise on earth, has glaciers, tundra, active volcanoes, geysers, and lava deserts throughout the island. Ice and fire coexist to form a natural classroom itself. This unique environment gives Icelanders fisheries, tourism industry, and abundant geothermal resources for clean and affordable energy. Its per capita income was US\$60,000; people were highly educated with high-quality social welfare and living environment. The affluence and longevity of their life were truly enviable.

However, Iceland was hit hard by the global economic crisis in 2008. The paradise was gone; three largest banks were taken over by the government. Their combined debts reached 9 times the nation's GDP of 14 billion Euros. On the verge of bankruptcy, Iceland turned to the low-cost geothermal as a lifesaver to attract the Americans to build numerous aluminum factories on the island, which ignited great controversy. Some scholars worried that the country will be wrecked by the aluminum industry besides the economic collapse. Residents also fear that the factories will destroy the natural environment and Iceland became a victim of aluminum industry.



冰島有美不勝收的景致，也有得天獨厚的地熱資源，但為了經濟，開放美國鋁業設廠，此舉引發兩極化評價 / Laurence 攝
Iceland boasts picturesque sceneries and abundant geothermal resources, but it opened up its market for the American aluminum factories and triggered great controversy. / by Laurence



當年，新中橫的開路計畫終止，方能保住玉山國家公園這片野生動物的天堂。在開發與保育的天秤上，執政當局都需要審慎的衡量評估 / 戴進元攝

The suspension of the construction of the New Central Cross-Island Highway helped preserve Yushan National Park, the wildlife paradise. The government has to carefully weigh the pros and cons of development and conservation. / by Jinyuan Dai

相較於由天堂落入凡間的冰島，向來樂天知命的不丹人面臨的則是截然不同的考驗。小小的不丹王國杜絕文明侵擾：全國禁菸、禁止塑膠袋進口，國民免費醫療與就學，土地貧瘠的不丹不因開發而大肆揮霍自然資源，森林覆蓋率達72%，為亞洲第一，且26%的土地為國家公園。此外，不丹也是全世界最後一個引進電視的國家，直到2000年才允許設置網路。

有趣的是，不丹國王提出了以「國家整體幸福」概念，以取代國民生產毛額作為測量人民福祉的指標，即便國民所得僅有1,400美元。號稱最快樂的窮國。

不丹堅守保留國土「純淨」的原則，不以積極發展經貿為導向。直到近期，不丹才開放觀光客入境。雖然觀光業為不丹第二大經濟來源，但為免觀光對傳統文化及人民生活造成衝擊，政府規定每位觀光客每天需付200美金的規費，而且只能在劃定地區遊覽，這都是為了強化國家認同，傳承文化與自然資產，單純的不丹人也就這麼循規蹈矩地過日子。

只是，這與世無爭的香格里拉，在接受外來文化衝擊後，漸漸產生變化。開放後變得現代多元的不丹，車輛變多，產生空氣污染，人民為了做生意開始有了爭執，在現代化的過程中，快樂國度還能不能延續快樂，正面臨著考驗。

「在氣候遽變、人類生命財產遭受威脅的此刻，許多人都在找解藥，問政府、問學者，想知道哪裡是可以安身立命的香格里拉。這些國際上的例子都

Compared to Iceland, Bhutan faced a totally different type of challenge. As a tiny country, Bhutan had said no to the intrusion of civilization while imposing no smoking and no plastic bags regulations nation-wide with free health care and education. Bhutan had not lavishly exploited its meager natural resources; the forest coverage rate reached 72%, the highest in Asia, and the area of its national parks was 26%. Bhutan also was the world's last country to introduce TV while it did not allow the setup of the Internet until 2000.

Interestingly, Bhutan proposed the idea of Gross National Happiness (GNH) to replace Gross National Product (GNP) as the indicator of people's well-being. Even though its per capita income was US\$1,400 only, Bhutan was known as the happiest poor country in the world.

Bhutan had insisted on maintaining pure national land and had not eagerly developed its trade and economy. Only until recently have entries of tourists been allowed. Even though tourism accounts for the nation's second largest revenue, the government had required each tourist pay US\$200 per day with only certain areas allowed for visits in order to strengthen national identity and cultural and natural heritage. The Bhutanese had been living such a simple life.

However, changes began to emerge in this peaceful Shangri-La under the impact of foreign cultures — more traffic, air pollution, and people's disputes on business profits, posing a big challenge about whether this land could maintain its happiness in the process of modernization.

"With climate changing abruptly and human lives and properties threatened, people are looking for antidotes and their Shangri-La. The above international examples may cause us to ponder: once the mother nature is destroyed, nothing can make up for the loss. What is the ultimate goal for

能讓我們深思，涵養萬物的自然大地一旦傾毀，再多的物質也無法彌補。人類最終追求的到底是甚麼？我想，那答案絕對不是豪宅、名車與財富。」張前署長富含深意的說。

善用現有的法 就是最好方法

「我們的國土濫墾問題嚴重，高山作物看似對居民經濟帶來助益，但長遠來看，土壤逐漸貧瘠，用再多肥料也種不出東西；為了運輸作物，必須在山區闢建產業道路，但逢雨必坍，維修耗費公帑，路斷橋壞修好就忘，直到來年颱風季又繼續循環……環境問題如同溫水煮青蛙理論，在日復一日的惡性循環中，人們麻痺了，等發現問題大條，常常為時已晚。」

莫拉克颱風過後，台灣出現許多檢討聲浪，有人認為國土欠缺妥適規劃，有人認為應該以嚴峻的法令，來確保國土完整。

「其實，台灣的每寸土地都有規劃，也有很多跟環境相關的法令，問題不在無『法』可用，而在能否有效執行。比方說，有人想在保育區設魚塢，如在法源依據下台電不核發電表，沒電，就不會有超抽地下水的問題產生。我認為，不應把希望放在制定新法，而是要讓法貫徹執行，既有的法依然能有效推動國土保護。」張前署長說。

國土保護不是一朝一夕，台灣需要全方位的體檢。「像是許多重要橋梁，橋墩建得密密麻麻，大水來時反成為阻礙溪流順暢的元凶，橋梁也容易斷裂。台灣應因地制宜，建造大跨距的橋梁，雖需較多經費，但卻可省下日後的維修重建費。」具備建築師身分的張前署長提出建言。

叔本華曾說，人只有按照自然所啓示的經驗來生活。全球氣候變異考驗或許難敵，但從那些世世代代屹立在山頭的大樹，仍能緊緊抓牢土壤，努力地讓大地承受的衝擊降至最低，就是給人們讓環境永續的解答。讓青山長青、綠水長流，就是讓大地迎戰天災的力量。災難的慘痛也許不堪回首，但帶來的省思與覺醒能給後代更美好的未來。🌿

humans? I believe, the answer is by no means mansions, luxury cars or wealth," said Chang profoundly.

Wise Use of Existing Law

"The problem of land exploitation has been serious. Crops grown in mountains appear to be economically useful, but in the long run, turn the soil infertile. To transport those crops, roads and bridges are built in mountain areas; yet, they will be destroyed whenever heavy rains come, and be fixed again by spending taxpayers' money. Every year during the typhoon season, the same things happen again and again. People get used to this vicious circle but realize its severity only when it's too late.

In the aftermath of Typhoon Morakot, some people thought that the national land lacks thorough planning; others argued that a more strict law is needed to protect the national land.

"In fact, every inch of land in Taiwan is under planning, and plenty of laws regarding environmental protection have existed. The problem is whether the law can be enforced effectively. For instance, if Taiwan Power Co. by following the law does not give the permission for electricity to someone who wants to build fish ponds in conservation areas, then the over-pumping of groundwater will not occur. So I think we should focus on how to thoroughly enforce the existing laws," Chang said.

National land protection cannot be done overnight but requires a comprehensive checkup. "Densely built bridge piers would obstruct the flow of flooding rivers, which may cause bridges to break easily. Taiwan should build bridges with large spans of piers. More budget is needed for this type of construction, but the cost for future maintenance and reconstruction will be saved," Chang suggested.

Schopenhauer once said people could only live in accordance with the experience inspired by Nature. While humans can hardly withstand the damages caused by global climate change, trees standing in the mountains for generations and easing the impact the land suffers from have given humans the answer for a sustainable environment: when the land is conserved, Nature's blows will be alleviated. Tragedies may be bitter, but it will awaken people to give serious thoughts on a better future for later generations. 🌿



高山地區大規模的開墾，種植蔬菜或高山茶，農業產值遠不及土石流帶來的損失 / 鄭真義攝

The agricultural output based on massive mountain exploitation such as growing mountain crops and tea will never compensate for losses due to debris flows and mudslides. / by Zhenyi Zheng