

Nature

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Seven Continents

A work by Danish artist Bjørn Okholm Skaarup, it distills the world into seven animals: the panda (Asia), emperor penguin (Antarctica), badger (Europe), tapir (South America), raccoon (North America), zebra (Africa), and koala (Australia). On shared land they join hands and dance, a feast across regions and cultures. TCC serves life, and the Seven Continents symbolizes dancing with nature, protecting biodiversity and realizing harmony between industry and nature.

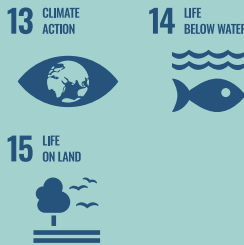


TCC Nature Action: TNFD

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5.1 TCC Nature Action: TNFD

TCC remains committed to exploring ways for civilization and nature to coexist in harmony, serving life, always in service of life.

—Chairman Nelson An-ping Chang

From cement to energy, and from Taiwan to the world, biodiversity has always been a crucial part of TCC's development. TCC Nature Action aligns with the 2030 actions and 2050 goals of Kunming-Montreal Global Biodiversity Framework from the UN Biodiversity Conference (COP15). In quarries, TCC restores native species and protects Bonelli's Eagle nests in Lisbon. At Hoping EcoPort and Sea of Marmara, cement is used to build habitats for corals and fish. In Gaoshu, Pingtung, the world-class botanical conservation center supported by TCC safeguards the future of rare plants and humanity.

The 2025 Climate Change Conference (COP30) in the Amazon further deepens the link between climate action and biodiversity. TCC believes Earth's balance relies on the restorative power of ecosystems like forests, oceans, and soil. TCC continues to focus on biodiversity initiatives, investing in forward-looking carbon sink and soil research, aiming for Net Positive Impact (NPI) and No Net Deforestation by 2040.

TCC's Terrestrial and Marine Nature and Biodiversity Programs Mapped to 23 GBF Targets

Reducing threats to biodiversity

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Committing to Long-term Forest, Soil, and Marine Restoration and Research Projects [CH 5.2-5.3](#)
CIMPOR Bonelli's Eagle Conservation
OYAK Cement Artificial Reef Project

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Hoping EcoPort Listed as Taiwan Marine Other Effective Area-based Conservation Measures (OECMs) [CH 5.3](#)

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Dr. Cecilia Koo Botanic Conservation Center (KBCC): Ex-situ Conservation Plan / Pharmaceutical Development [CH 5.5](#)

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Invasive Alien Species White Popinac Removal [CH 5.4](#)

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Chiayi Aquavoltaics, Yingde Plant Solar Grazing [CH 5.4](#)
Low-carbon Construction Materials Development [CH 2.1](#)

Fulfilling Human Needs through Sustainable Utilization and Benefit Sharing

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Kaohsiung Shoushan Land Transformation to Detention Basin Park

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Green Value Chain Alliance / Low-Carbon Construction Pioneers Alliance

Implementation tools and mainstreaming solutions

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Little Tern Conservation Project
Environmental Education_Hoping EcoPort, TCC DAKA, Guigang and Yingde Plants, and Ho-Ping Power Company [CH 5.6](#)

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Biodiversity Management Plan (BMP)
Regular Monitoring of Quarry and Marine Ecosystems
Release of Task Force on Nature-related Financial Disclosures (TNFD) Report

1920

Ho-Ping Ark Ecological Program 2.0 [CH 5.2](#)

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Implementation of Consultation and Consent Rights for Indigenous Peoples

23

Nature-related Project Team is Led by a Woman (the Chief Sustainability Officer)

Note 1: Kunming-Montreal Global Biodiversity Framework available on [Convention on Biological Diversity \(CBD\) website](#).

By 2040

Net Positive Impact (NPI)
No Net Deforestation

TARGET

[Biodiversity Policy](#)
[No Deforestation Commitment](#)





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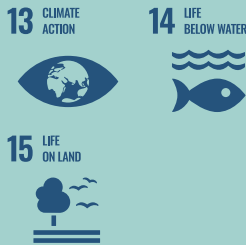
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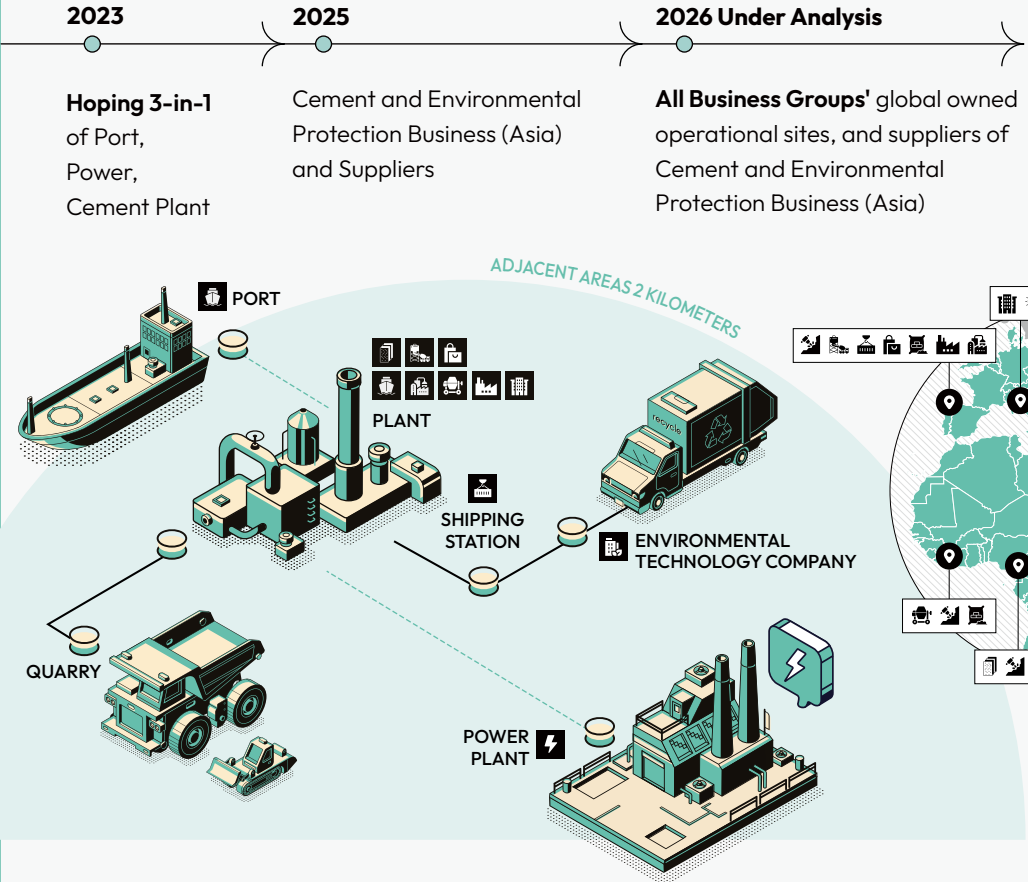
TCC Nature Management

Assessment and Management Conducted in Accordance with International Standards, the Task Force on Nature-related Financial Disclosures (TNFD)



Under the Corporate Sustainable Development Committee, TCC established Biodiversity Group using the TNFD LEAP methodology. This allows TCC to inventory natural capital dependencies and impacts, establish strategies, identify risks, and conduct financial assessments, thereby elevating nature issues to the corporate strategy and risk governance. Since 2023, TCC has aligned nature conservation actions with international TNFD transition plan guidance, and published TNFD REPORT to demonstrate concrete actions and performance in response to global initiatives.

LOCATE



Upstream	Owned Operation	Downstream	Adjacent Area
QUARRY	AGGREGATE PLANT	SHIPPING STATION	POWER PLANT
PORT	CEMENT PLANT	PORT	
	RMC PLANT	ENVIRONMENTAL TECHNOLOGY COMPANY	
	GRINDING STATION		
	OFFICE		
	GYPSUM PLANT		
	DRY-MIX MORTAR PLANT		
	PAPER BAG PLANT		
	RENEWABLE ENERGY SITE		
	BATTERY PLANT		

For 2026 LOCATE analysis results and site areas, please refer to the [ESG section of TCC's official website](#). (expected to be released in September 2026)

2026 Analysis Boundaries:
Owned operational sites:
Global sites of TCC's nine business groups, including Taiwan, Mainland China, Türkiye, Portugal, Cameroon, and Ivory Coast, totaling 390 sites.

Supplier sites:
Cement and Environmental Protection Business (Asia) suppliers on Science Based Targets Network (SBTN) high-risk list.



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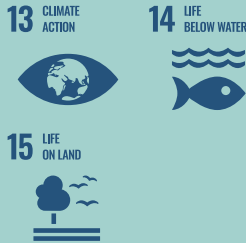
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LOCATE

TCC Locate Methodology
Description



100% of TCC's operational sites are not situated within World Heritage areas or International Union for Conservation of Nature (IUCN) Category I-IV protected areas

Note2: Taiwan's ecosystem sensitivity analysis areas encompass important biodiversity habitats, including National Parks, Important Wetlands, Coastal Protection Zones, Nature Reserves, Nature Preserves, Wildlife Refuges, Major Wildlife Habitats, Conservation Corridors, and Key Biodiversity Areas (KBAs).

Sites are evaluated based on two major criteria: Criterion I – Natural Sensitivity and Criterion II – Operational Impact.

Criteria	Nature Sensitivity		Criterion II – Operational Impact
	Criterion I-1 – Ecosystem Sensitivity	Criterion I-2 – Species Sensitivity	
Basis	Whether sites are located in or adjacent to ecologically sensitive areas	The number of threatened species potentially occurring around sites	Taiwan sites added analysis based on actual conditions Calculate the vegetation naturalness of the site based on current land use to determine the degree of operational impact on the environment
Taiwan	- Ministry of the Interior's National Land Function Zones - Ministry of the Interior's Marine Resource Areas - Statutorily Protected Areas in Taiwan - Non-statutorily Protected Areas in Taiwan - Disaster Potential Map	Taiwan Biodiversity Network Data	Methodology for Assessing Plant Naturalness in Environmental Impact Assessments
Mainland China	- National Protected Areas - World Database on Protected Areas (WDPA) - Key Biodiversity Areas (KBA) Database - Ramsar Convention (Ramsar) List of Wetlands of International Importance (newly added) - Man and the Biosphere Programme (MAB) World Network of Biosphere Reserves (newly added)	- China Natural Observation Species Distribution Database - IUCN Redlist Species Distribution Database - Mean Species Abundance (MSA)	-
Overseas sites	- World Database on Protected Areas (WDPA) - Key Biodiversity Areas (KBA) Database - Ramsar Convention (Ramsar) List of Wetlands of International Importance (newly added) - Man and the Biosphere Programme (MAB) World Network of Biosphere Reserves (newly added)	- Mean Species Abundance (MSA) - IUCN Redlist Species Distribution Database	-

Definition of Priority /Nature Sensitivity Rated from low to high as L, M, H, and VH

VH	Contains important ecosystems, hosts multiple threatened species, and is located in areas with high naturalness; operations may have negative impacts on nature.	H	Contains important ecosystems, hosts multiple threatened species, and is located in areas with high naturalness.	M	Contains relatively important ecosystems, hosts a few threatened species, and is located in areas with relatively low naturalness.	L	Does not contain important ecosystems, has no distribution of threatened species, and is located in areas with low naturalness.
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EVALUATE-ENCORE

Analysis for Owned Operations, Upstream, Downstream, and Surrounding Areas

In alignment with the TNFD methodology and Sector Guidance, TCC uses the ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) tool, jointly developed by the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and Finance Initiative (UNEP FI), to analyze the potential dependencies and impacts of operational sites on nature at a global scale.



ENCORE Description

Based on various scientific literature and databases—such as Intergovernmental Panel on Climate Change (IPCC) and UNEP—industries are assessed for their levels of impact and dependency on nature, rating them from 1 to 5 (low to high).

ENCORE Analysis for Owned Operations, Upstream, Downstream, and Surrounding Areas

TCC's Operations' Dependencies on Ecosystem Services	Types of Owned Operational Sites				
	Quarry	Cement Plant RMC Plants Grinding Station	Office	Port Area	Power Plant
Flood mitigation services	4	3	1	4	3
Global climate regulation services	4	1	1	1	3
Dilution by atmosphere and ecosystems	3	2			
Rainfall pattern regulation services	5	2	1	1	
Soil and sediment retention services	4	2	1	2	3
Solid waste remediation		3			3
Storm mitigation services	3	3	1	3	2
Water flow regulation services	4	3	1	3	4
Water purification services	5*	3			3
Water Supply	4	3	1	2	4
Natural disaster protection (earthquakes, mudslides, typhoons, etc.)	5	5	5	5	5
Impact of TCC Operations on Ecosystem Services					
Area of freshwater use	4	3		1	3
Area of land use	3	2	3	2	3
Area of seabed use	4*			3	
Disturbances (e.g, noise, light)	4	3	1	1	5
Emissions of GHG	4	4	1	3	5
Emissions of non-GHG air pollutants	4	4	1	2	5
Emissions of nutrient pollutants to water and soil		3	1	3	
Emissions of toxic pollutants to water and soil	4	5	1	2	5
Generation and release of solid waste	2	3	1	2	4
Introduction of invasive species	1				
Other abiotic resource extraction	5				
Volume of water use	3	3	2	2	3

Note 3: For ENCORE results of other operational types (e.g., shipping stations, environmental technology companies, and paper bag plants), please refer to [ESG section of TCC's official website](#).

Note 4: TCC's quarries only require water quality standards for plant restoration and have relatively low dependence on water quality. Moreover, all quarries are located on land and do not affect seabed usage.



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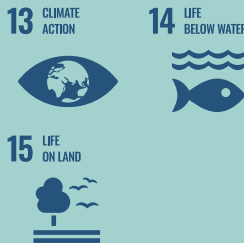
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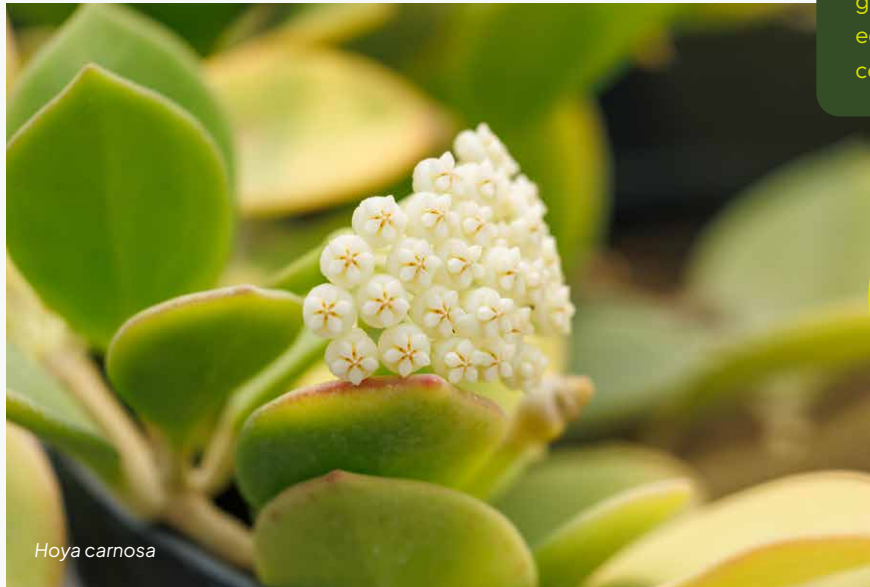
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LOCATE

EVALUATE-ENCORE

COMPREHENSIVE ANALYSIS



Hoya carnosa

Nature is a prerequisite for TCC's operational development

TCC prioritizes the management of sites with VH natural sensitivity and adopts corresponding databases as the basis for determination according to local conditions.

Taiwan sites integrate national land functional zones and biodiversity network data, while combining the naturalness survey methods of environmental impact assessments to add operational impact for analysis. Mainland China and overseas sites utilize international databases such as WDPA, Convention on Wetlands, World Network of Biosphere Reserves, and IUCN species distributions. Since

Through engagement, TCC guides suppliers to deepen ecological thinking, align with the corporate philosophy, and demonstrate a commitment to mutual benefits, thereby establishing a foundation of trust for future actions.



Yang Sheng-hsien & Liu You-kai
TCC Supply Chain Management Department

VH sites are located in close proximity to critical ecosystems and contain threatened species, poor management can trigger environmental resilience degradation, worsening natural disaster impacts and operational losses. Located mainly in upstream quarries and owned plants, TCC's VH sites are cross-evaluated with ENCORE level 5 operational types to map dependencies and impacts on natural capital.

Concurrently, TCC formulates adaptation strategies and measures to minimize impacts and promote biodiversity restoration. Reserves, and IUCN species distributions.

Supplier Nature-related Risk Assessment

TCC used the high-impact list of SBTN and the proportion of procurement amount as screening principles to target raw material suppliers of limestone and aggregates for Locate analysis. The results show that 10 suppliers are located in sensitive ecosystem areas such as protection forests and river zones, with multiple threatened species potentially distributed within their operational scopes. In October 2025, TCC selected 4 of these limestone suppliers to initiate engagement, explaining the TCC's emphasis on biodiversity, informing them of the potential impacts of their operational sites on ecological protection areas, and further conducting on-site visits. The suppliers also shared on-site ecological observations and actual restoration actions, jointly discussing feasible mitigation measures and future collaboration directions to reduce potential impacts upstream in the value chain.



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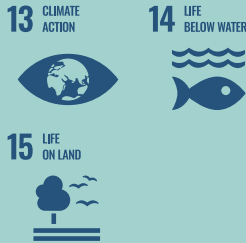


Location of VH Sites	Locate	Evaluate(ENCORE)	Comprehensive Analysis Results	Adaptation Methods
Hoping Quarry Taibaishan Quarry Shoushan Land Taiwan	Hoping and Taibaishan Quarry are adjacent to coastal protection and land protected areas; Shoushan land is adjacent to Shoushan National Park, featuring species such as pangolins, brown wood owls, etc.	Quarry Relies on rainfall regulation services to avoid floods and mudslides; quarrying operations will alter land use, affecting biodiversity.	Quarrying destroys environment, increases the risk of debris disasters in quarries, and shortens their service life.	All quarries implement a Biodiversity Management Plan (BMP). Collaborating with academia, TCC uses scientific surveys for plant restoration and sustainable resource use (CH 5.2).
Yingde Quarry (Dapashan and Qingshuijing) Shaoguan Beihushan Quarry Mainland China	The Yingde and Shaoguan quarries are adjacent to Black Tea Valley Forest Nature Park and Huashuihan Nature Reserve, respectively, with potential distributions of endangered species such as the Chinese giant salamander, golden coin turtle, etc.			
Limestone Suppliers Taiwan	The suppliers’ locations are adjacent to coastal protection areas, security forests, and rivers, with potential distribution of protected animals such as the styan’s bulbuls, and fairy pittas, etc.		Quarrying damages the ecological environment, increases the risk of debris disasters, and leads to the decline of coastal protection functions.	TCC communicates ecological impacts to suppliers, verifying their environment assessment compliance, and partners with authorities for restoration and ongoing mitigation talks.
Zhongli RMC Plant Taiwan	Adjacent to nationally important wetlands, the surrounding area features abundant natural forests and low development. Potential habitats include protected species such as plumbeous water snakes, and Taipei grass frogs, etc.	RMC Plant Operations may generate GHG emissions and water pollution.	Highly alkaline wastewater with high suspended solids can cause long-term soil alkalization and water pollution in sensitive areas. Beyond increasing equipment maintenance and water extraction costs, these discharges damage ecosystems and weaken environmental resilience.	Implementing environmental management systems, the plants ensure regulatory compliance to minimize impacts. Both Zhongli and Yingde plants achieved zero process wastewater discharge and recycled rainwater. Zhongli also conducted third-party monitoring, while Yingde introduced multi-stage combustion to reduce air pollution.
Yingde Cement Plant Mainland China	Adjacent to Black Tea Valley Forest Nature Park, with potential distribution endangered species such as the Chinese giant salamander, golden coin turtle, etc.	Cement Plant Operations may cause air and water pollution.		



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0403 Hualien Earthquake: Nature-related Risk and Resilience Assessment

Origin Time: 2024/04/03 07:58:09 (GMT+08:00)
Lat:23.77N Lon:121.67E Mag:7.2 Depth: 15.5 km

Intensity
Level 1 2 3 4 5-Weak 5-Strong 6-Weak 6-Strong Level 7

Source: National Science and Technology Center for Disaster Reduction (NCDR)

Hoping 3-in-1 of Port, Power, Cement Plant: VH Site Highly Dependent on Natural Ecosystem Services

Introducing TNFD LEAP in 2023, TCC identified its Hoping 3-in-1 of Port, Power, Cement Plant as a nature-sensitive core site, assessing natural resource dependencies and impacts via ENCORE and practical experience:

Dependency shows "Natural disaster protection" reached level 5, indicating high dependence.

Impact identifies "Other abiotic resource extraction ", "Emissions of non-GHG air pollutants", "Emissions of GHG ", and "Disturbances" as core issues, indicating the potential impact on surrounding environment and habitats.

Aspect	Impact	Response Measure
Natural Impact	Other abiotic resource extraction	Compared to traditional open-pit quarrying, Hoping Quarry adopts "vertical shaft quarrying" and long-term restoration for soil and water conservation. Quarry's structure remained stable without collapse during the strong earthquake.
	Emissions of non-GHG air pollutants	Via EMS, smart monitoring, low-carbon equipment, and enclosed corridor transportation for dust control, the plant achieves zero wastewater discharge to minimize operational impacts.
	Emissions of GHG	
Operational Impacts	Disturbances	
	Interruption of External Roads	After the earthquake blocked roads, TCC activated emergency responses and backup routes, ensuring personnel safety. Operations maintained via shifts during month-long repairs, while TCC formally applied to construct a permanent backup quarry road.
	Post-earthquake Recovery and Environmental Monitoring	Following earthquake damage, TCC completed repairs and seismic retrofitting across these sites to enhance disaster resistance. Post-disaster surveys confirmed the port area maintains healthy coral habitats, demonstrating natural resilience.

Financial Impacts

By 2025, sites' losses reached NT\$2.2 billion. Hoping Cement Plant repairs will continue into 2026.

Nature and Biodiversity Expenditures

In 2025, TCC invested NT\$57.71 million in nature protection actions, including diverse eco restoration, Hoping Eco-Ark, building long-term natural resilience.

Demonstrating Environmental Resilience and Adaptation Capabilities

Daily nature-risk management enables TCC to respond rapidly to disasters. In 2026, Hoping Plant will introduce ISO 22301, advancing post-earthquake repairs and drills to strengthen resilience while re-identifying physical risks like earthquakes and slope stability. Concurrently, TCC formulated a nature management plan, integrating quarry and coral data to promote NbS and OECM, balancing ecological conservation with operational resilience and enhancing adaptation capabilities.

For more information, please refer to past [TNFD REPORTs](#) and [ESG section of TCC's official website](#).



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SBTN AR3T

TRANSFORM

- Recycles waste and uses agricultural residues (cocoa shells, corn stalks) as alternative fuels to cut carbon.
- Hoping EcoPort Obtained Marine OECMs certification.
- Shoushan land was transformed into a trail and detention basin park for recreation and flood control.
- Promotes NbS and ecological construction, transforming industrial spaces into environmental education bases.
- OYAK Cement's Beypazarı solar project completed an environmental assessment, proposing environmental mitigations.

REGENERATE
RESTORE

- Taiwan and Mainland quarries plant native species to restore soil health and increase carbon sinks.
- Connecting plants with surrounding mountains establishes ecological corridors, reducing habitat fragmentation for species migration.
- Restoring neighboring water bodies creates eco-ponds, rain gardens, and drip irrigation systems.
- Hoping EcoPort added land crab-friendly corridors in wetlands, connecting ocean and land as a habitat relay station.
- CIMPOR monitors Bonelli's Eagle nests in Alhandra quarry to conserve endangered bird species.
- OYAK Cement deployed 100 artificial reefs and released juvenile fish to restore marine ecology.

REDUCE

- Deployed electric mining trucks to cut emissions, noise, and air pollution, reducing disturbance.
- Removing invasive alien species reduces ecological harm; Hoping and Suao plants convert white popinac into biomass fuel.
- Separates rainwater and sewage to reduce impacts on local water systems.
- Plants use cement kilns to dispose of sludge, domestic waste, and other wastes, reducing potential environmental pollution.
- Cement, battery plants, and Ta-Ho Maritime install automatic monitoring and optimize fuel to mitigate air pollution.

AVOID

- No TCC sites quarry in global national protected areas; all Taiwan and Mainland China quarries passed environmental impact assessments.
- Enclosed quarry corridors prevent raw material dust, while ecological buffer zones protect surrounding natural areas from construction.
- Collecting cooling water and rainwater, plants implement zero wastewater discharge.
- Bans herbicides and pesticides, using manual mowing or solar grazing.
- Evaluates suppliers' biodiversity impacts and response measures.
- Installed AI fire control and warning systems to prevent emergency environmental damage.



SCIENCE BASED
TARGETS NETWORK
GLOBAL COMMONS ALLIANCE



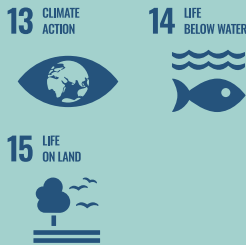
What Is SBTN?

The SBTN, built on the Science Based Targets initiative (SBTi), is a network of 80+ NGOs and business groups—including CDP, WRI, WWF, and IUCN working with companies to drive positive outcomes for nature through alignment with global ecosystem initiatives.



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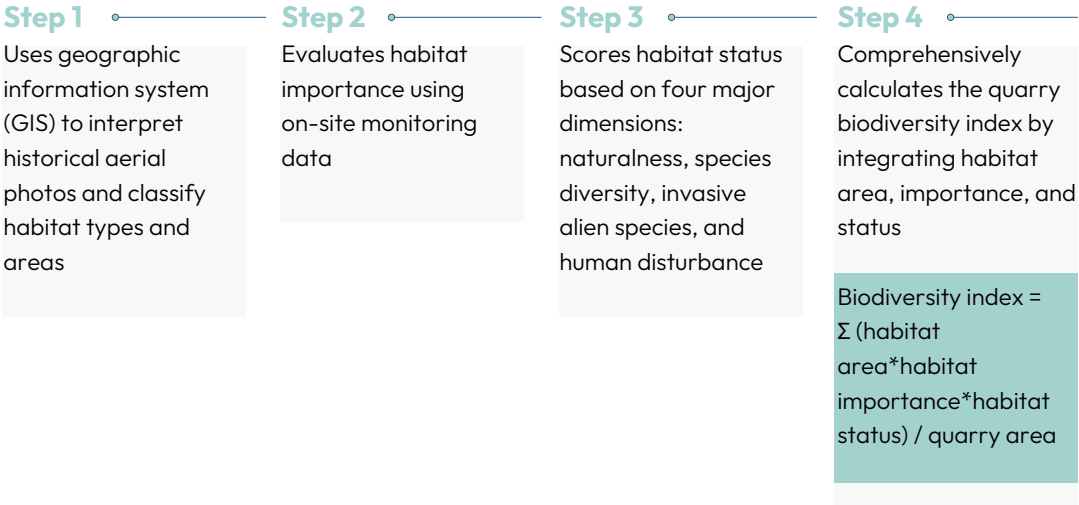
Setting 2040 Net Positive Impact

TCC's Taiwan quarries have initiated long-term restoration plans since 2016. To assess whether restoration efforts have a positive impact on nature, scientific analyses of ecological trends since the start of quarrying were conducted, thereby setting a 2040 net positive impact (NPI) target.

Adopted Methodology: Net Impact Assessment (NIA) references the "GCCA Sustainability Guidelines for Quarry Rehabilitation and Biodiversity Management" and the "WBCSD Net Impact Assessment Methodology for the Cement Sector"⁵, analyzing in 3–4 year intervals.

Analysis Boundaries: Hoping Quarry and Taibaishan Quarry, which will gradually expand to global quarries.

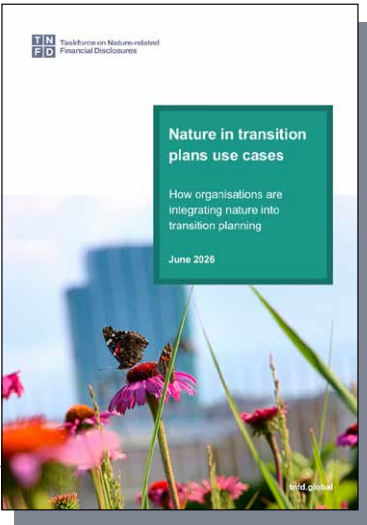
Analysis Steps:



Analysis progress: Completed analysis of mining start year 2002 and 2008–2022; will subsequently conduct an in-depth analysis of the 0403 strong earthquake's impact on the differences before and after in quarry ecology. The NIA trend chart is expected to be published on the [TCC official website's ESG section](#).

Note 5: For more information, please refer to the GCCA Sustainability Guidelines for Quarry Rehabilitation and Biodiversity Management, and the World Business Council for Sustainable Development (WBCSD) Methodology for the Net Impact Assessment of Biodiversity in the Cement Sector.

ACTION SPOTLIGHT



Hoping Quarry Enhancement and Empowerment Project Selected as a TNFD Transition Plan Case Study

To accelerate ecological restoration at Hoping Quarry's 1,015-meter area, TCC launched a team empowerment program in 2024, engaging experts to optimize methods and developing a dedicated manual. This initiative aligns with "Governance" skills and competencies under nature transition planning, and was selected as a demonstration case in the TNFD "Nature in transition plans use cases" published in June 2026.

Subheading TCC Implements It's Now for Nature Pulse Transition Pathway

The October 2025 "It's Now for Nature Pulse" report notes a global gap in comprehensive nature disclosure. As an initiative partner, TCC actively implements the TNFD framework and LEAP methodology across operations and suppliers, and was invited to share its practical results within the report.

It's Now for Nature

"Nature is the Sine Qua Non, an essential element. By openly disclosing our dependencies on nature, we can prioritize the most impactful actions. As well as helping us to proactively manage risks, this has helped turn our nature-positive efforts into a competitive edge."

Nelson An-ping Chang
Group CEO, TCC Group Holdings

Discover more in the It's Now for Nature Pulse.



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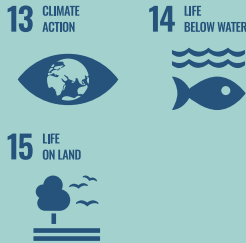
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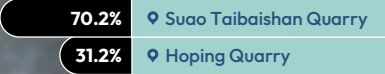
2025 TCC GROUP HOLDINGS
SUSTAINABILITY REPORT

5.2

Forest & Soil Restoration



Rehabilitation
and Revegetation Rate



Mainland China 24 Quarries
Rehabilitated
Restored Plants

2,841,949

Rehabilitation
and Revegetation Rate

20.3%



TCC KEY FACTS

Biodiversity Management Plan (BMP)

| Cement and Environmental Protection Business (Asia)

Quarry Rehabilitation Plan (QRP)

| Cement and Environmental Protection Business (Asia)

| Cement and Environmental Protection Business (Europe-Africa)

Coverage
Rate

100%



Taiwanese endemic plant *Dischidia formosana*, photographed at Hoping quarry



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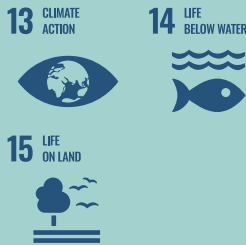
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Forest Restoration

Quarries are the core of the cement industry. TCC strives for minimal environmental impact during quarrying and ensures that sites are restored to nature after operations cease.

TCC quarries adopt an ecosystem restoration model, prioritizing the Cement and Environmental Protection Business to formulate a Biodiversity Management Plan (BMP). Global quarries have established a Quarry Rehabilitation Plan (QRP), aiming to achieve the Nature Positive goal.



Lotus Pond, Yinde Plant

Cement and Environmental Protection Business (Asia) — Taiwan Quarries - Adheres to the principle of simultaneous quarrying and rehabilitation - Targets native species for rehabilitation - Collaborates with the Dr. Cecilia Koo Botanic Conservation Center (KBCC) and professional units to establish nurseries and hardening facilities at plants to cultivate local native species - Increases vegetation diversity through natural succession	Cement and Environmental Protection Business (Asia) — Mainland China Quarries - Upholds the principle of "restoring farmland to farmland, forest to forest," and formulates quarry geological environment protection and land reclamation plans - Responds to the national standard of "General Principles for Assessment of Green Mine" to build "new green quarries" - Adopts stepped quarrying to minimize environmental impact, uses vegetation bags made of naturally degradable materials to stabilize slopes, and coordinates with hydroseeding methods for greening - Actively promotes rehabilitation in closed quarry areas, including slope adjustment, topsoil preparation, soil covering, and tree seedling planting	Cement and Environmental Protection Business (Europe-Africa) - Follows the biodiversity roadmap of CEMBUREAU - Refers to GCCA's Sustainability Guidelines for Quarry Rehabilitation and Biodiversity Management and the EU's Nature Restoration Regulation Actively plans habitat rehabilitation measures, and targets to formulate quarry biodiversity management guidelines based on the rehabilitation results of the Antalya Plant in Türkiye, and the biodiversity monitoring plans of the Darica Plant and Bolu Plant.
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Ecological Recovery Wheel and Biodiversity Index Survey: Tracking Restoration Effectiveness

TCC established the Ecological Recovery Wheel based on the Society for Ecological Restoration (SER) methodology, using seven indicators: canopy cover, non-pioneer species, stratification, vegetation height, regeneration species, biodiversity index and important value index of indigenous species (IVI). The 2025 assessment covers Hoping and Taibaishan quarries, with tracking to expand to other sites.

Additionally, biodiversity surveys across six major biological taxa have been conducted since 2021 for long-term management.

The Results: Hoping Quarry exhibited steady growth in long-term succession indicators like vegetation height and biodiversity index. Meanwhile, Taibaishan Quarry utilized diverse afforestation strategies to stabilize the restoration area environment within a shorter timeframe.

Though adopting different approaches, both quarries significantly improved biodiversity.

Note 6: The 2026 Ecological Recovery Wheel indicator data will be disclosed in the [ESG section of the TCC official website](#).



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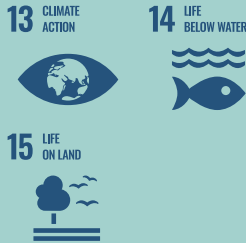
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Native Plant Rehabilitation

Hoping Quarry, Hualien



Rehabilitation Starting Point:

Launched a long-term rehabilitation plan since 2016

Third-Party Monitoring:

Conducted quarterly since 2003

Team:

Hoping Cement Plant and Ho Sheng Mining Co., Ltd.

Rehabilitation Method:

Assisted natural regeneration, accelerating the rehabilitation process with less intervention

Habitat Type:

Mainly primary and secondary forests

To ensure rehabilitation effectiveness, the team cultivates seedlings in stable, low-altitude nurseries, transplanting them to harsher quarries once adapted to boost survival rates. Meanwhile, the team collects fruits from local native plants to raise seed-grown seedlings for replanting, thereby maintaining genetic diversity within the quarry area.

Wind-Resistant, Drought-Tolerant, and Site-Specific Rehabilitation

Taibaishan Quarry, Suao



Rehabilitation Starting Point:

Initiated non-rapid rehabilitation since 2017

Third-Party Monitoring:

Conducted semi-annually since 2003

Team:

Professor Ji-Wei Huang, Sustainable Landscape Research Laboratory, National Ilan University

Rehabilitation Method:

Miyawaki Method, achieving environmental protection through high-density planting of multiple species

Habitat Type:

Shrubland and secondary forest, with a landscape characterized by highly water-retention-deficient karst topography

Taibaishan Quarry uses unique solar-powered drip irrigation system, windbreak nets, and rainwater harvesting to increase water availability. To boost soil fertility and plant growth, barren soil is mixed with chicken manure, spent mushroom substrate and organic matter. Increasing planting density further enhances the plants' resistance to strong winds.

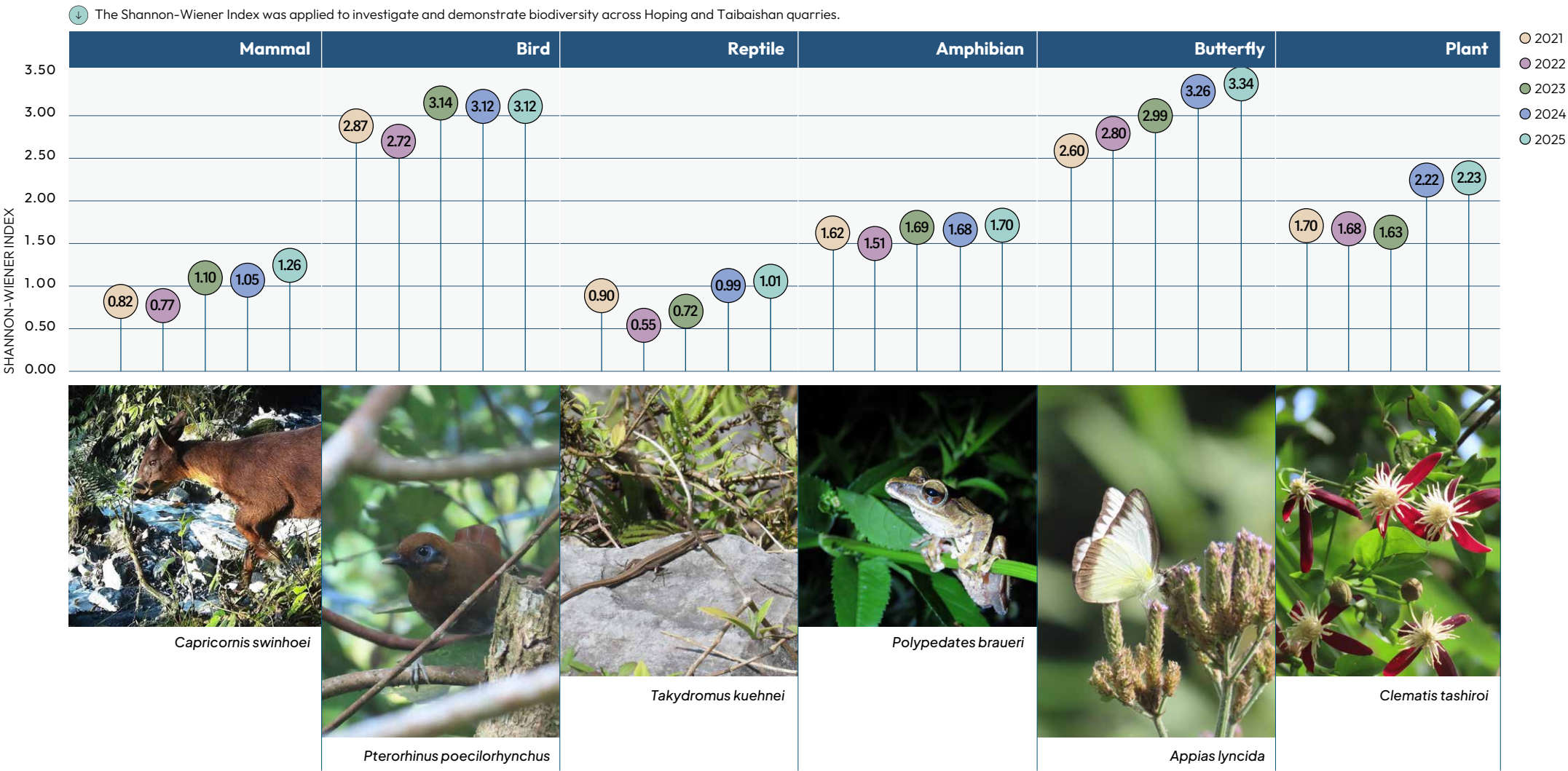
OYAK Cement

Quarries, Türkiye



Since halting production in 2017, the Antalya Plant has replanted over 13,000 trees and installed 12 km smart drip irrigation and wildlife water stations. The Darıca and Bolu plants launched biodiversity monitoring in 2025, surveying vascular plants, mammals, birds, amphibians, and reptiles alongside habitat features and conservation status. These results will guide specific actions, serving as the foundation for quarry rehabilitation across OYAK Cement.

Biodiversity Index





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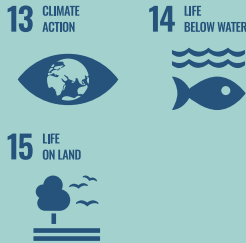
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CIMPOR Joins Forces
with Government and Academia
to Protect the Endangered Bonelli's Eagle

The Bonelli's Eagle, an endangered species in Portugal, faces threats such as habitat degradation, power line collisions, and illegal hunting. A breeding pair has established a nest within CIMPOR's Bom Jesus quarry, providing an opportunity to integrate biodiversity conservation into quarry operations. In 2024, CIMPOR joined the EU LIFE LxAquila Project, partnering with public

authorities, the Portuguese Society for the Study of Birds (SPEA), academia to support habitat protection and species recovery. In 2025, CIMPOR incorporated biodiversity protection into quarry management, implementing measures to safeguard the nesting area and reduce disturbance during breeding periods. Key conservation measures include:



Established a 500-meter buffer zone around the nesting site, whose location is kept confidential, and implemented seasonal restrictions during the breeding season (December–June), with regular monitoring conducted in partnership with SPEA.

Implemented cliff protection and power line insulation measures to reduce risks from rockfalls and electrocution.

Restored water sources, native vegetation, and key food-chain species to enhance habitat suitability.

Partnered with SPEA under a land stewardship model to support habitat restoration and transform the quarry into a biodiversity conservation site.



National-Level Green Quarries

Mainland China



8

National-Level
Green Quarries

- 1 Jurong Xiguoding Quarry
- 2 Chongqing Niubeiji–Shujingpo Quarry
- 3 Anshun Hejiayuan Quarry
- 4 Yingde Qingshuijing Quarry
- 5 Yingde Longweishan Quarry
- 6 Guigang Huanglian Bayangshan Quarry
- 7 Guigang Huanglian Heshangshan Quarry
- 8 Guigang Huanglian Yishan Quarry

8

Provincial or Autonomous
Region-Level Green Quarries

- 1 Yingde Dapashan Quarry
- 2 Yingde Hongguang Quarry
- 3 Jingzhou Tongle Quarry
- 4 Gangan Shujingpo Quarry
- 5 Shaoguan Beihushan Quarry
- 6 Guigang Hongyuan Quarry
- 7 Liaoning Limestone Quarry
- 8 Xuyong Huangcaoping Limestone Quarry



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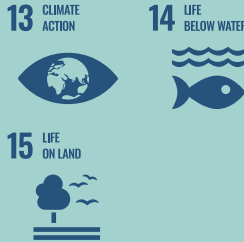
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Soil Research

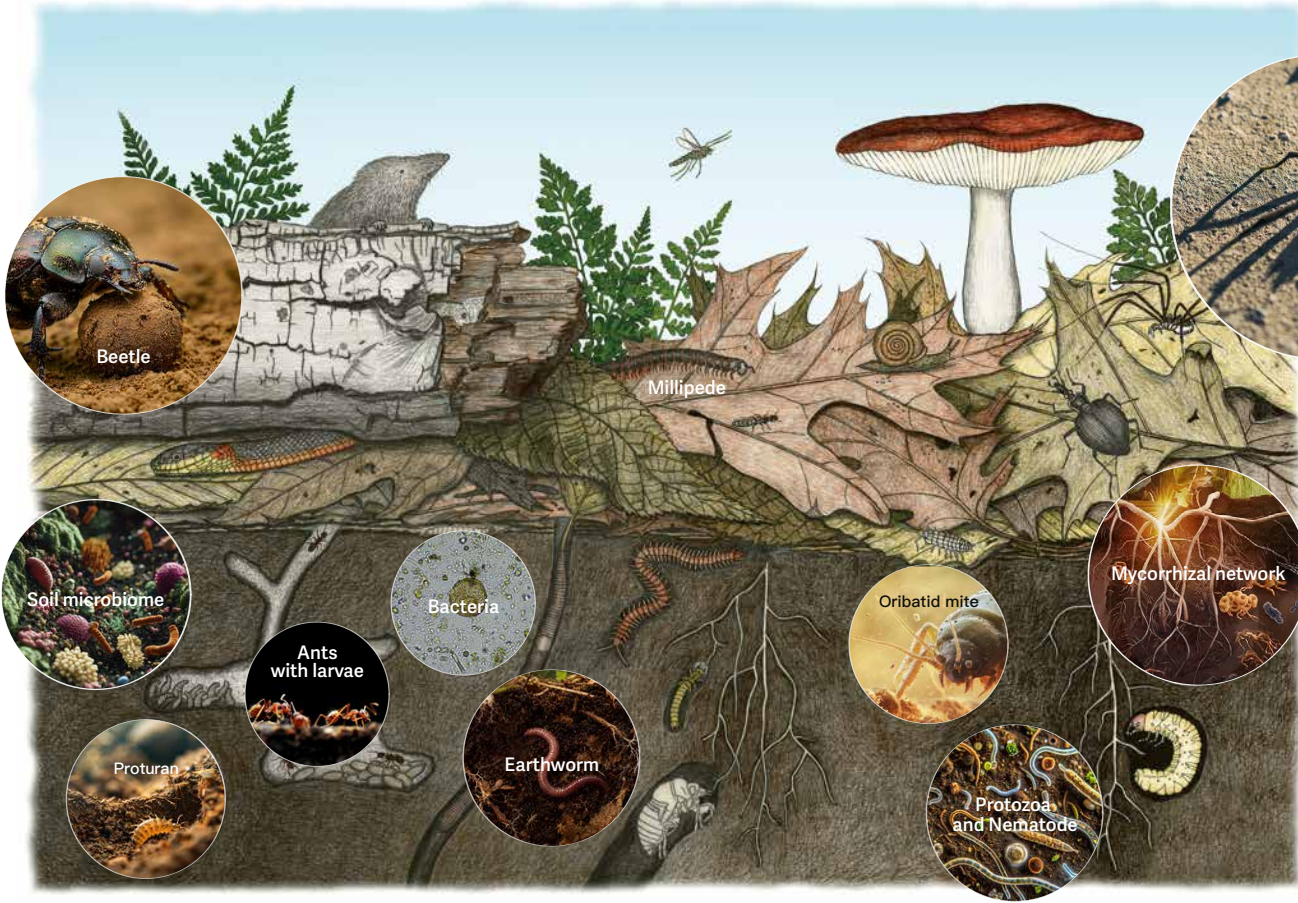
Soil is the most important terrestrial carbon sink, absorbing 25% of human greenhouse gas emissions annually, with 60% of biodiversity living underground. However, human activities cause soil degradation and biodiversity loss. During forest restoration at the quarries, TCC discovered that soil cannot return to its original state simply by backfilling or retaining topsoil,

because soil properties are inherently disturbed during quarrying. To improve restoration outcomes, TCC initiated in-depth soil research in 2022.

TCC's 2024 preliminary survey at Hoping Quarry showed that after 16 years of multi-phase restoration, soil Total Organic

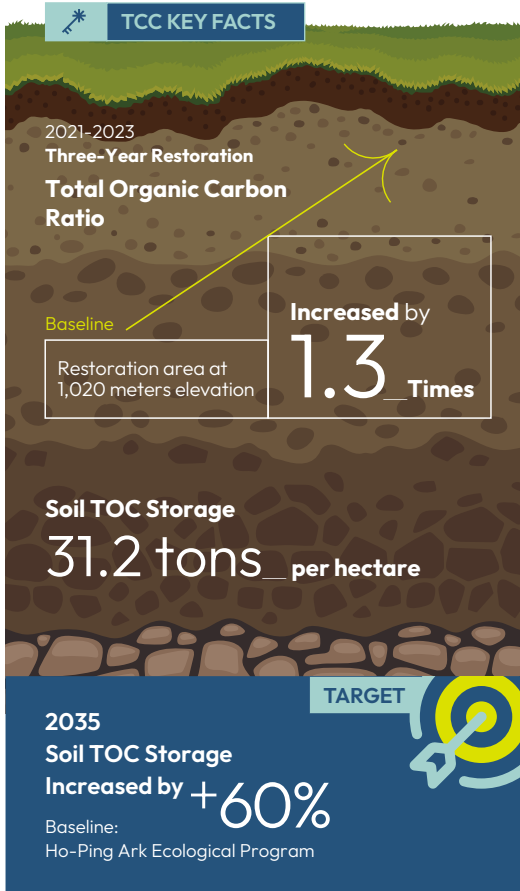
Carbon (TOC) storage exceeded those of urban parks. Notably, topsoil backfilling and vegetation restoration at 1,060 meters elevation (restored for 3 years) resulted in TOC storage 1.3 times higher than the 1,020 meters elevation area. Furthermore, after over a decade of vegetation restoration, typical soil fauna like earthworms and native nematodes have emerged, indicating

that TCC's long-term efforts are gradually recovering soil ecosystem services. The second-phase survey targets completion by August 2026. Because soil TOC accumulates over long periods with minimal short-term fluctuations, TCC plans to conduct surveys every five years to scientifically verify effectiveness.



Soil teems with life—from ants and earthworms to springtails, pseudoscorpions, and countless microbes essential to soil health.

Reference:
Life in the Soil:
A Guide for Naturalists and
Gardeners. (James B. Nardi.,
2007)





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LIFE BELOW WATER



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LIFE ON LAND



2025 TCC GROUP HOLDINGS
SUSTAINABILITY REPORT

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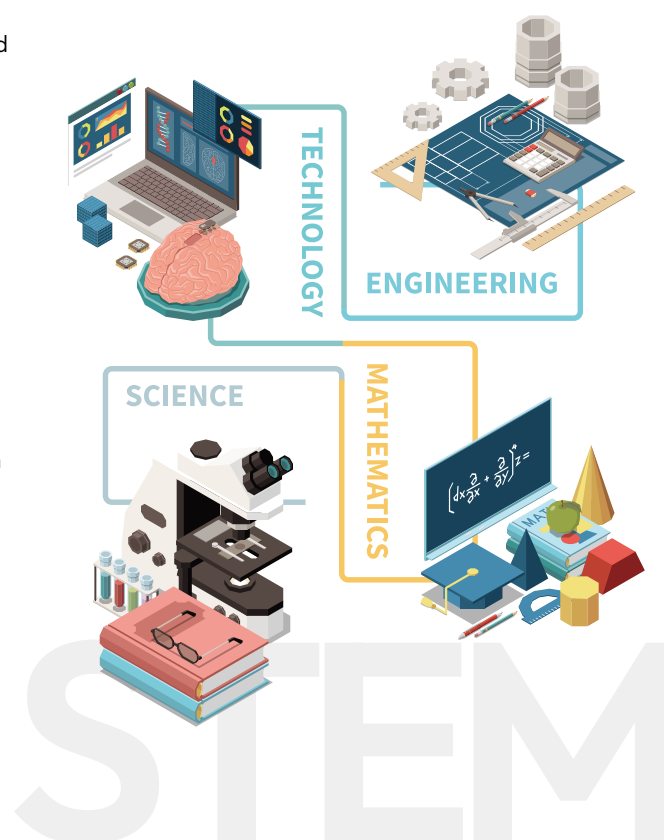
Soil Talent Development

TCC aims to inspire young students to enter soil science. Since 2024, TCC has established the Soil Award and organized the Soil Camp to encourage academic research. The 2025 Soil Camp, themed "Earthworm Class Reunion," used this common organism as an entry point to introduce participants to the underground world

of soil organisms, from millipedes and spiders to lesser-known pseudoscorpions and fungi. Targeting rising high school sophomores, the camp encourages young women to enter STEM fields by implementing a one-third minimum female quota.

The Soil Award represents an academic breakthrough, inspiring professionals to continuously cultivate and pass on their expertise. The 2024 Gold Award winner, Hsiang-Yun LIN, who discovered a new pseudoscorpion species unseen in Taiwan for over 80 years, now fosters grassroots science

education as a student teacher. Invited as a lecturer for the 2025 Soil Camp, she shared her journey of soil enlightenment, transforming her passion for the land into inspiration for future generations.



2025 TCC "Earthworm Class Reunion" AI Summer Camp:

A Shovel of Soil, a Sustainable Future
— A Dialogue Between Tech and Earth



TCC offered a specialized course exploring AI and land management, progressing from AI fundamentals to practical environmental monitoring. Beyond theoretical cases, hands-on sessions led students to operate simple monitoring instruments and use AI to interpret soil moisture data for a practical firsthand experience. Through this three-day empowerment, students proactively integrated

their learning with external data to propose innovative, AI-driven soil management concepts on the final presentation day. Ultimately, the course inspired youth to view AI not just as a data tool, but as a critical solution for environmental challenges and land sustainability.



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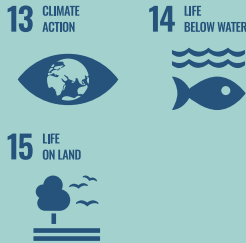
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2025 TCC GROUP HOLDINGS
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Ho-Ping Ark Ecological Program 2.0

TCC launched the soil-centric Ho-Ping Ark Ecological Program in 2022 and targets its 2.0 edition in 2026. Focusing on soil talent development and soil trials, the program utilizes proprietary sites for zoned ethnobotanical restoration on limestone terrain, alongside soil health and biodiversity research, integrating



scientific expertise with traditional ecological knowledge to create soil remediation solutions.

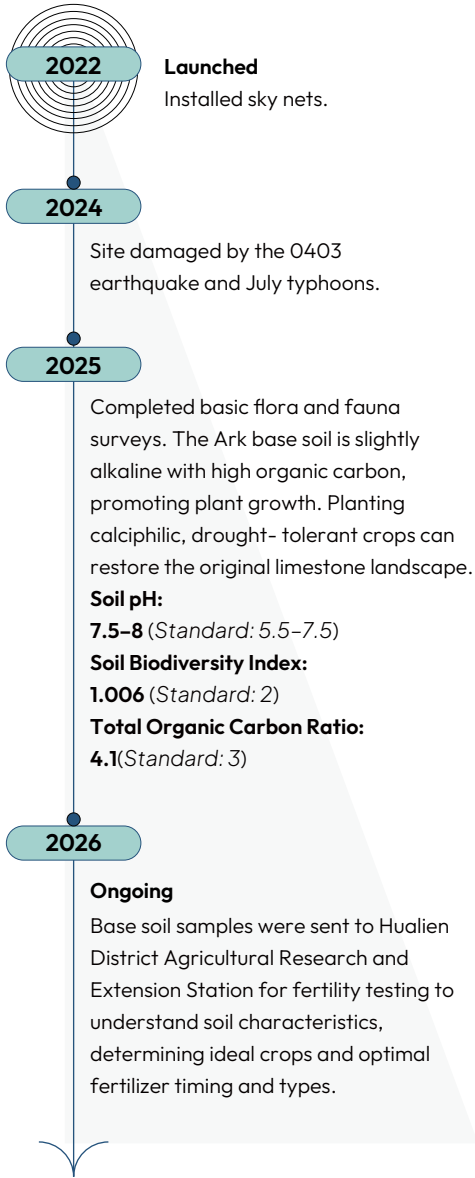
Focus 1 — Soil Talent Development: Combining Traditional Ecological Knowledge to Restore Soil and Knowledge

TCC plans to collaborate with key indigenous schools in eastern Taiwan or local Hoping tribal groups. Integrating university internships with just transition principles, this initiative will establish a green skills training base to cultivate professional talents, continuing and innovating indigenous agricultural wisdom. Through agroforestry and ecological mutualism, TCC will intercrop and rotate traditional crops with native plants to enhance soil activity and productivity. Based on Truku records, native species like *Schefflera octophylla* and *Rhus chinensis* will be selected as alternative configurations.

Theme 2 — Soil Trials: Creating Nature-based Resilience Through Field Experiments and Verification

TCC will collaborate with the Taiwan Forestry Research Institute to conduct ethnobotanical restoration trials on-site, regularly monitoring soil pH and physical properties. Simultaneously, controlled laboratory trials will evaluate combining cement industry materials with biochemical mechanisms for substrate improvement. This initiative will gradually establish a long-term soil health database and develop climate-resilient, recycled products, aligning with international Nature Positive trends.

Ho-Ping Ark Ecological Program History





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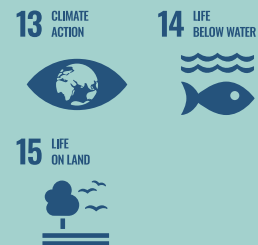
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5.3 Marine Restoration



TCC KEY FACTS

Coral Restoration Project

2025 Newly Added Coral Seedlings

+1,145 seedlings

Number of Restored Corals

+589 seedlings

Accumulated as of 2025/12/31

Coral Survival Rate

82.96%

2024-2025

Second Phase Coral
Planting Project
with Grating Plates

Coral Area Growth Rate

142.10%



Giant Clam Survey

3 species
Individuals **98**



Fish and Shellfish Survey

217 species
Individuals **11,091**



OYAK Cement Artificial Reef

Sea of Marmara, Türkiye



Biodiversity of Hoping EcoPort's coral reef ecosystems



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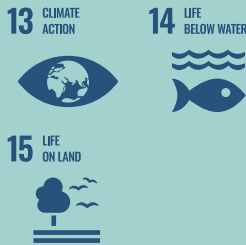
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Hoping EcoPort

Located in Hualien, Hoping EcoPort was built via inland excavation to accommodate vessels while preserving the eastern coastline's natural landscape, unexpectedly becoming a coral sanctuary. Adhering to international standards, the port integrates environmental friendliness into its core operations. Since discovering corals within its waters over a decade ago, it has actively driven conservation and established comprehensive ecological data.

Trajectory of Coral Restoration at Hoping EcoPort

2015	Conducted underwater biological surveys
2019	Achieved EcoPorts PERS Certification (maintained continuously ever since).
2020	Conducted coral species identification surveys.
2021	■ Achieved Green Port Award System (GPAS) certification (maintained continuously ever since). ■ Launched Bio Cube Construction Project
2023	Initiated fish and shellfish survey.
2024	■ Launched coral planting project with grating plates ■ Created artificial wetlands ■ Won First Prize in the National Environmental Education Award (Corporate Category)
2025	■ Initiated Chinese Spiranthus Survey and Bird Survey ■ Won the inaugural Corporate Marine Sustainability Contribution Award ■ June: Recommended for OECM designation following Ocean Affairs Council on-site assessment.
2026	April: Officially designated as an OECM by the Ocean Affairs Council.



Hoping EcoPort Designated as Taiwan's Marine OECMs

The global ocean is nearing an ecological tipping point. Under COP15's Kunming-Montreal GBF, the "30x30" target aims to protect 30% of global land and oceans by 2030, leveraging Other Effective Area-based Conservation Measures (OECMs) as a key mechanism. This initiative drives a "Nature Positive" approach to actively reverse environmental degradation. Taiwan's Marine Conservation Act took effect in July 2024, making Taiwan the first nation to codify OECMs into law to align with the international "30x30" conservation target through expert certification. Since 2021, Hoping EcoPort has driven coral restoration, creating healthy marine habitats and establishing a complete ecological management mechanism. Recommended by the Ocean Conservation Administration (OCA) and marine experts, the

port officially applied at the end of 2025. Following rigorous review, it was successfully designated as part of Taiwan's first batch of marine OECMs in April 2026. Moving forward, TCC will regularly upgrade ecosystem restoration plans, expand the marine protection network, and interconnect surrounding critical habitats. This initiative aims to enhance the resilience of Taiwan's blue territory, practicing the harmonious coexistence of TCC's industry and nature.



What Are OECMs?

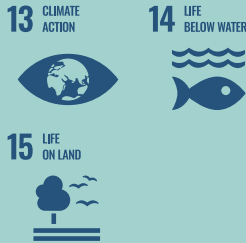
OECMs are geographically defined areas other than Protected Area. Through effective governance, they deliver positive, long-term sustainable impacts on ecosystem services while supporting cultural, spiritual, and socio-economic values. Under the UN Convention on Biological Diversity, OECMs count toward global conservation acreage within the "30x30" target. Consequently, identifying and designating OECMs has become a strategic priority for nations worldwide.





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Three Major Zones of Hoping EcoPort OECM

In accordance with the grading concept of "Sanctuary Zones" in the Marine Conservation Act, Hoping EcoPort divided the recognized area of 43.3 hectares into a "Core Zone", "Buffer Zone", and "Sustainable Use Zone" to balance ecology and operations.

Total Designated Area: 43.3 ha

Core Zone: 9.89 ha
(30-meter Coastal Ecological Hotspot)

—
The ecological nucleus for coral, fish, and shellfish growth. Hoping EcoPort implements the strictest ecological conservation and monitoring here to ensure the stable development of habitat organisms.



Buffer Zone: 27.61 ha
—

Situated between the Core and Sustainable Use Zones to maintain ecosystem and nutrient cycle integrity, mitigating potential disturbances from port operations on the Core Zone while conducting ongoing ecological surveys.

Sustainable Use Zone: 5.8 ha
(30-meter buffer from the 500-meter turning basin edge)

—
Surrounding the turning basin to ensure vessel safety, this zone continuously monitors environmental data due to the higher ecological impacts associated with port operations.

5 Major Biodiversity Values of Hoping EcoPort

- Critical Ecological Connectivity**
Connecting East Coast coral ecosystems
- High Biodiversity**
Total 11,091 fish and shellfish 217 species
- Rare Natural Resources**
Discovered of 3 rare giant clam species
- Biodiversity Protection**
Fishing prohibited to protect aquatic life
- Important Life History Habitat**
High maturity ratio of *Tridacna maxima*, serving as a germplasm repository

Ecosystem Service Functions
and Values of Hoping EcoPort as OECM

- Provisioning Services: Fish and Shellfish**
Indirect eco-benefits via the habitat support.
- Regulating Services: Climate Regulation**
Ecosystems indirectly enhance coastal resilience.
- Supporting Services: Food Webs & Habitats**
Restoration fosters robust food webs.
- Cultural Services: Tourism, Education & Research**
Academic collaboration advocates ecosystem value.

Village Chief:

Unrealized how breathtaking the port
in our hometown is!



TCC engaged key stakeholders to communicate Hoping EcoPort's OECM value and restoration achievements, securing their Free, Prior, and Informed Consent (FPIC).





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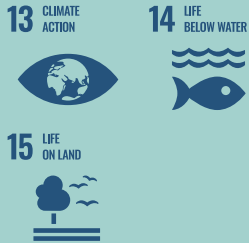
→ **Marine Restoration**

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↑ *Millepora*

During a coral species identification survey at Hoping EcoPort in 2020, there are many small branching corals on shallow wave-dissipating revetments highly vulnerable to wave damage or mortality. In 2021, the Bio Cube Coral Construction Project was launched in collaboration with the Eco-Angel Environment Conservation Association, utilizing low-carbon cement bases for coral restoration.

First Phase of the Bio Cube Construction Project

In 2021, the team installed bio cubes in areas of the port less affected by wind and waves. Integrating TCC's core business, Hoping Ecoport used low-carbon cement as the base to transplant coral fragments broken by natural factors or port waves onto the bio cubes, restoring their growth opportunities. Although some bio cubes were damaged by earthquakes and typhoons in 2024, the total coral area growth rate reached 3.7 times from 2021 to the end of 2024, with an average annual survival rate exceeding 80%. As growth has stabilized, monitoring will be conducted simultaneously with the second phase starting in 2026.

Second Phase of the Coral Planting Project with Grating Plates

The team expanded the coral planting area, completing all coral habitat creation with grating plates in January 2024, marking Taiwan's first successful coral restoration case in an industrial port. However, frequent natural disasters in recent years have challenged restoration results, with typhoons and earthquakes successively striking in 2024–2025, damaging 269 corals. Although the impacts occurred, 1,145 new coral seedlings were naturally added in 2025, demonstrating the resilience of the port's ecosystem. Hoping EcoPort will initiate repair and expansion works in 2026, reinstalling 20 grating plates (approximately 100 corals restoration). In the future, Hoping Ecoport will evaluate allowing the public to participate in coral planting, encouraging public attention and involvement in marine conservation actions.

Giant Clam Survey

Although coral reefs cover only 0.2% of the ocean, they support a quarter of marine life. As coral populations enrich, the underwater ecosystem of the port increasingly completes. Beyond transplanted corals, natural coral seedlings and giant clams—listed in Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1983—were discovered on bio cubes. Thus, Hoping EcoPort incorporated giant clam growth data into marine management indicators in 2022. Giant clams are highly sensitive to environmental conditions; wild populations are extremely rare due to environmental changes and human disturbances. Eco-Angel recorded 108 individuals at Hoping EcoPort in 2025, but

only 56 remain following recent earthquakes and typhoons. The maturity proportion is high, with an 88% maturity rate for *T. maxima*, the highest in Taiwan. Future monitoring and research on giant clam growth and maturity will clarify how environmental stressors affect their life history.

*Secretary-General of Eco-Angel:
Hoping EcoPort Has the Highest
Density of Giant Clams in Taiwan*



↑ *Tridacna maxima*



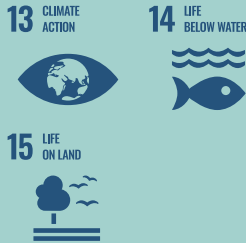
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Fish and Shellfish Survey

Hoping EcoPort collaborates with Taipei University of Marine Technology to conduct fish

and shellfish surveys using Underwater Visual Census and underwater cameras for species identification. The 2024 survey results showed

that biodiversity around the bio cubes was the highest, meaning the bio cubes and the corals growing on them provide sufficient habitat

space and food sources for fish. Long-term monitoring will continue to track whether biodiversity is increasing annually.

ACTION
SPOTLIGHT

Optimization Directions for
TCC's 3D Printed
UHPC Restoration Bases

TCC studied algae and coral attachment on various base materials. As 3D printing creates natural-like wrinkles and porous structures simulating natural coral reef textures, 3D-printed UHPC restoration bases were installed in October 2024 on Hoping EcoPort grating plates for long-term recording and observation of coral growth.

Research Objectives:

- Whether it promotes coral fragment attachment and algae colonization
- Impact of base shape on fish hiding
- Durability of UHPC in seawater environments

OYAK Cement
"Footprints of Life:
Nest of the Ocean" Project

On the 2025 International Biodiversity Day, OYAK Cement deployed 100 artificial reefs in waters 8–12 meters deep along the coast of Izmit Bay, using Durabet concrete made from its lowest-carbon cement. To increase populations, 6,000 juvenile fish were released in the bay, with long-term monitoring conducted alongside Kocaeli University to enhance ecological benefits.





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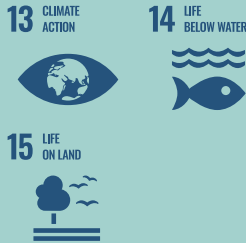
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Artificial Wetland and Bird Survey

Hoping EcoPort added an artificial wetland in 2024, connecting land and sea areas, and introduced native plants and the endemic species *Aphyocypris kikuchii* listed in The Taiwan Red List, gradually attracting the natural migration of shrimp, crabs, amphibians, and reptiles. Migratory *Macrobrachium spp.* were recorded in February 2025. Monitoring by National Dong Hwa University recorded 49 bird species and 1,460 individuals as of 2025, covering protected species such as Styan's Bulbul and Little Tern, indicating a stabilized environment.

Hoping EcoPort expands conservation from artificial wetlands to local land crabs, protecting their land-sea life cycle of inland habitats and marine spawning migrations. The wetland serves as an ecological corridor buffer, reducing industrial habitat fragmentation and shortening migration distances.

By using leaf compost, Hoping EcoPort created land crab habitats and guided them from ditches to wetland ponds. This also provides habitats for lizards and skinks, boosting bird foraging and multi-level food chains. Future work will focus on insect surveys, native species conservation, and ecological corridor optimization.

Chinese Spiranthes Survey

Chinese spiranthes is listed in Appendix II of the Convention on CITES due to habitat loss and over-collection. Hoping EcoPort avoids herbicides and pesticides, serving as a native sanctuary. A 2025 survey by the team from National Dong Hwa University identified 1,943 individuals in 1.3 hectares, alongside rare species such as *Ophioglossum thermale* and *Eulophia dentata*. Population monitoring will continue in 2026 to provide a foundation for green space management within Hoping EcoPort.

Rare Terrestrial Species First Discovered
in the Artificial Wetland:

 **Birds:**
Northern Lapwing
(rare migratory bird)

 **Frogs:**
Latouche's Frog

 **Snakes:**
Oriental Rat Snake

 **Butterflies:**
Plain Tiger



↑ The long-distance migratory Northern Lapwing, the national bird of Ireland, was recorded for the first time at the wetland, resting during its transit through Taiwan.

ACTION
SPOTLIGHT

Hoping EcoPort Water
Environment Watch

The Water Environment Watch was voluntarily established by employees in 2023 and grew to 18 members by 2025, representing an internal employee participation rate of 41%. The team targets the continued maintenance of the coastal environment at the estuary of Heping River and plans to establish two-way ecological connection through land crab habitat creation. In 2025, a total of 99.81 kg of waste was collected, with no abnormal incidents reported during this period.

TCC KEY FACTS

Artificial Wetland Creation

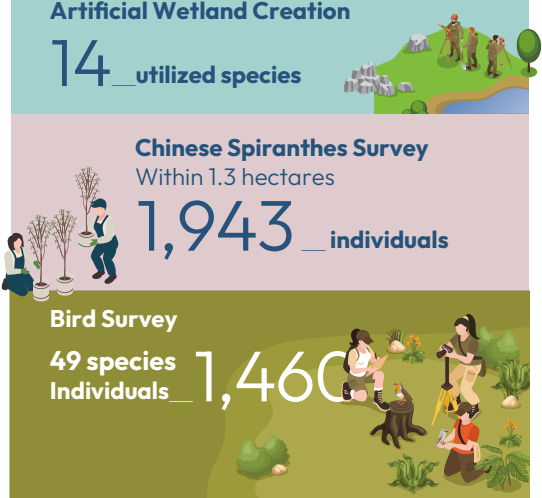
14 utilized species

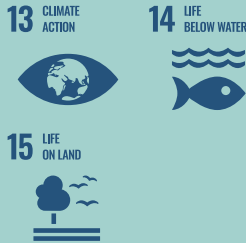
Chinese Spiranthes Survey
Within 1.3 hectares

1,943 individuals

Bird Survey

49 species
Individuals 1,460





5.4 Nature-based Solutions (NbS)

The 2025 COP30 in the Amazon urged returning “life itself” to climate dialogues. With United Nations Framework Convention on Climate Change (UNFCCC) viewing Nature-based Solutions (NbS) as key to the climate-nature crisis, TCC implements an NbS operational model to drive carbon reduction and green

enhancement. By managing site-level environmental impacts, restoring ecosystems, and protecting endangered species, TCC transforms damaged natural capital into resilient ecological assets, mitigating climate change while creating a nature-positive impact.



What Is NbS?

The International Union for Conservation of Nature (IUCN) defines NbS as actions to protect, sustainably manage, and restore ecosystems to address societal challenges, simultaneously benefiting human well-being and biodiversity.



+ TCC NbS Cases

Removing Invasive White Popinac: Mitigating Ecological Threats and Reducing Carbon
TCC co-processes invasive White Popinac into zero-carbon energy, removing **606.45 tons** in 2025 to reduce **721.68 tCO₂e**.

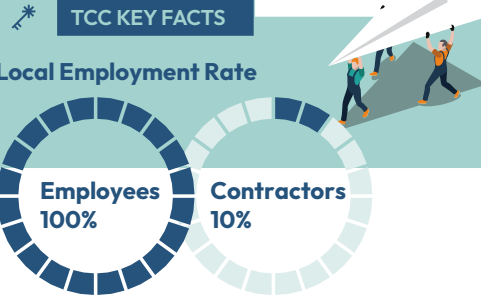


Addressing Challenges:
Climate Change Mitigation and Adaptation, Economic and Social Development

Creating Opportunities:
Transitioning to low-carbon energy, promoting local employment, and empowering local talent

Centered on geothermal power with ecological monitoring, grid connection is targeted for 2026. Serving as a regional revitalization platform, the park prioritizes local hiring, promotes Bunun culture, and integrates energy, tourism, and culture.

After Typhoon Morakot, TCC applied its DAKA experience to propose a dual-track model of geothermal energy and tourism, cooperating with LDC Hotels to build "Vakangan Green Energy Hot Spring Park." The park adopts low-impact development, retaining one-third of green space for flood storage to enhance climate resilience.



OECMs - Hoping EcoPort Ecological Restoration: Building Homes for Corals with Concrete Bases
Hoping EcoPort enhances biodiversity as a sanctuary for marine ecosystems.

Chiayi Aquavoltaics: Revitalizing Fishing Villages Under the Sun
Green energy hub helps 80% of farmers get TAP, supporting Green Care.



TCC Nature Action: TNFD

Forest & Soil Restoration

Marine Restoration

Nature-based Solutions (NbS)

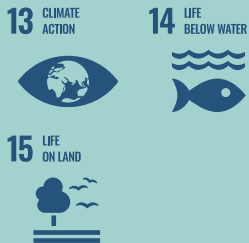
Natural Benefit Sharing

Environmental Education

Social Inclusion

Appendix

Alignment with SDGs



ACTION
SPOTLIGHT

Solar Grazing: Creating a Triple Win for Economy, Environment, and Society

Addressing Challenges:

Climate change mitigation and adaptation, economic and social development, environmental degradation and biodiversity loss

Creating Opportunities:

Lowering operational costs, fostering community co-prosperity, and enhancing ecological benefits

Since 2024, TCC Yingde Plant has pioneered a "solar grazing" model, transforming a 34,000 m² solar site into a pasture. Sheep replace chemical herbicides by grazing naturally, raising their market value to 1.6 times that of captive-bred livestock, creating an economic and environmental win-win. Targeting solar expansion in 2026, the plant integrates grazing routes into panel design. The flat terrain also reduces risks for elderly shepherds, addressing an aging farming population. TCC further plans academic collaborations to study how sheep manure improves soil health, establishing quantitative indicators for a scientific operational model.

TCC KEY FACTS



YouTube Video



Overview

Governance

Carbon Reduction

Energy Transition

Employee

Nature

TCC Nature Action: TNFD

Forest & Soil Restoration

Marine Restoration

Nature-based Solutions (NbS)

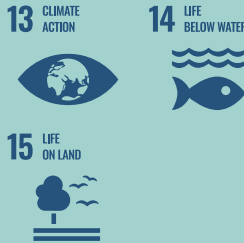
Natural Benefit Sharing

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2025 TCC GROUP HOLDINGS
SUSTAINABILITY REPORT

5.5 Natural Benefit Sharing

Dr. Cecilia Koo Botanic Conservation Center

The Convention on Biological Diversity (CBD) sets three main objectives: "the conservation of biological diversity," "the sustainable use of its components," and "the fair and equitable sharing of the benefits arising out of the utilization of genetic resources." Furthermore, the Kunming-Montreal Global Biodiversity Framework (GBF) and CBD COP 16 both emphasize the importance of fair and equitable sharing of genetic resources globally.

TCC has supported the Dr. Cecilia Koo Botanic Conservation Center (KBCC) since 2007. Located in Gaoshu Township, Pingtung County, KBCC is dedicated to conserving tropical and subtropical plants globally, having become the world's largest conservation base for these species. Led by Executive Director Chia-Wei Li, Hou Chin-Tui Chair Professor at National Tsing Hua University, KBCC adopts scientific management, assigning exclusive barcode labels to each plant and tailoring temperature, humidity, and sunlight conditions to their native habitats within its isolation greenhouses for ex-situ living preservation and academic research.

In 2025, the Center provided genetically stable, purebred *Azolla germplasm* (a floating fern commonly found in paddy fields and wetlands) for research. Known for its nitrogen-fixing properties and symbiotic relationships with

microorganisms, this germplasm promotes nutrient cycling and agricultural research. This contribution assisted a multinational team in completing a genetic analysis of symbiotic microorganisms, which was published in the *ISME Journal*⁷, a top-tier microbial ecology journal. This milestone further strengthens TCC's research foundation in natural capital and ecological restoration. Simultaneously, greenhouse cultivation and identification at the Center led to the discovery of a newly recorded species of *Araceae*⁸.

Plant extracts serve as vital sources for pharmaceuticals. In addition to collaborating with academic institutions to build an extract library for anti-cancer and COVID-19 antiviral research, KBCC provided the native plant *Monstera epipremnoides* to help National Tsing Hua University successfully develop a patented new drug for brain injury. Furthermore, in 2024, the Center partnered with the Taiwan Polar Research Center at National Central University to send over 400 varieties of Taiwanese indigenous millet seeds to the Svalbard Global Seed Vault in Norway. Looking ahead to 2026, the partners plan to collaborate again to formulate future plans, ensuring the preservation and restoration of global plant germplasm in the face of extreme disasters and climate change, thereby safeguarding TCC's sustainable commitment to Taiwan's indigenous knowledge and native species.



TCC KEY FACTS

As of Dec. 31, 2025
Conservation of plants

34,556 taxa
from around the world

Plants frozen in liquid nitrogen
8,709 species
62,037 frozen specimens

Accumulated
6,500 samples for medical use

The Conservation Center Team



TARGET

40,000 species
conserved by 2030

Note 7 : Adaptive pangenomic remodeling in the *Azolla* cyanobiont amid a transient microbiome
Note 8 : *Amydrium* Schott (Araceae), A Neglected Genus to the Flora of Taiwan and Lanyu



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CLIMATE ACTION



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LIFE BELOW WATER



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LIFE ON LAND



2025 TCC GROUP HOLDINGS
SUSTAINABILITY REPORT

ACTION SPOTLIGHT

Critically Endangered *Monoon liukuense*: First Recorded Coexistence with the Atlas Moth

KBCC collaborated with the Bank of Flowers and Trees to re-store the critically endangered (CR) plant *Monoon liukuense*, listed in "The Red List of Vascular Plants of Taiwan". During routine observations in 2025, larvae of the Atlas moth (*Attacus atlas*), Asia's largest moth, were found inhabiting and foraging on the plants. Since *Monoon liukuense* is not a typical host plant for the

Atlas moth, this discovery may represent the first recorded ecological association between the two species, potentially serving as a key ecological indicator for habitat restoration. KBCC will continue tracking this development, providing first-hand observation records to contribute to scientific re-search.



News Link: Atlas Moth Caterpillars Found on Endangered *Monoon liukuense* at "Bank of Flowers and Trees"—Believed to be Taiwan's First Recorded Case by Academia.



Success in Ex-Situ Propagation of the Rare, Critically Endangered *Eria herklotsii*

Confirmed as a new species in 2010, *Eria herklotsii* is found only in southeastern Taiwan, southern China, and Vietnam. Threatened by illegal poaching and habitat destruction due to its ornamental value, only one wild population remains in Taiwan. In 2017, it was listed as Critically Endangered (CR) in the Red List of Vascular Plants of Taiwan. KBCC acquired the last remaining wild individual in 2018 for ex-situ conservation. By replicating its epiphytic environment, KBCC successfully propagated seedlings in greenhouses, which will be transplanted for acclimatization to cultivate wild-resilient plants.

Only scientifically documented species can receive effective protection. Beyond establishing academic foundations, discovering new species can unlock medical or technological breakthroughs. KBCC plans to collaborate with the Ministry of Agriculture and Taiwan Forestry Research Institute to reintroduce *Eria herklotsii* to its original habitat in Taitung.



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5.6 Environmental Education

TCC integrates environmental education concepts into operational sites. The Bromeliad Garden gathers 147 species and thousands of bromeliads, serving as a vital engagement link for plant conservation and ecological restoration. Facilities are adjusted according to local conditions—for example, by adding bird collision prevention designs—to urge the public to pay attention to nature issues. RRRC, which opened to the public at the end of 2025, features a specially designated “Fern Garden” that gathers endangered and common fern species from around the world, raising awareness of how deeply human life depends on

plants. Environmental education not only enhances stakeholders' understanding of TCC's concepts and sustainability actions but also increases employee identification. This momentum drives Hoping EcoPort, Ho-Ping Power Company, and even overseas sites, to voluntarily pursue environmental education facility certifications, linking corporate sustainability efforts throughout the entire value chain. TCC will continue to expand its influence through environmental education, demonstrating the possibility of harmonious coexistence between humans and nature.

ACTION SPOTLIGHT

Hoping EcoPort & Ho-Ping Power Company Invited to Participate in Taiwan Science Train

In 2025, Hoping EcoPort and Ho-Ping Power Company participated in the Taiwan Science Train event at the invitation of National Dong Hwa University and National Science and Technology Council. Hoping EcoPort promoted marine conservation through images of giant clams growing in the port area; Ho-Ping Power Company used the themes “Lighting Up a Sustainable New Future” and “Good Neighbor of Hoping—The Little Tern” to demonstrate converting light, wind, water, and sea into electricity, while using puzzles to guide the observation of little tern features, inspiring care for natural ecosystems.



OYAK Cement also participated in the World Environment Day workshop of the Izmit Municipality, making windmills with children to foster sustainability awareness.

TCC's Global Environmental Education Sites

2022

Hoping EcoPort

Taiwan's first port-based environmental education facility, with coral reefs and tropical fish visible to the naked eyes along the shore! For more information, please refer to [CH5.3](#)

2023

Guigang Plant

Green transition of modern factories subverts public stereotypes!

2026

Ho-Ping Power Company

Turning “desulfurization gypsum” —a power generation byproduct— into DIY eco-aroma stones inspires a new appreciation for electricity, a resource we take for granted !

ONGOING

TCC DAKA and Yingde Plant

Open factory practices demonstrate how to balance green electricity and ecological cycles, creating economic, environmental, and social benefits! For more information, please refer to [CH5.4](#)



TCC KEY FACTS

Cumulative to 2025

Environmental Education Courses

Hoping EcoPort

Ho-Ping Power Company

80_sessions

3,323_participants

Ecological Guided Tour

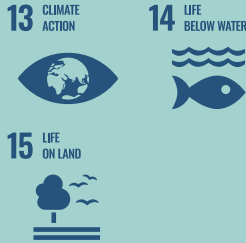
TCC DAKA

2,505_participants





Alignment with SDGs



ACTION
SPOTLIGHT

Little Tern Conservation Project
— Hoping Welcomes You

In 2024, the protected Little Tern nested near Hoping Power Plant for the first time. The plant and Hoping EcoPort launched a conservation program with the Wild Bird Society of Hualien:

Three-Year Monitoring Program: Conducting annual monitoring (April–August) and installing protective signs.

Rooting Ecological Education: Visiting local elementary schools to promote conservation.

Cross-Boundary Patrol Team: Employees and suppliers patrol during breeding seasons, utilizing identification software to enhance ecological recording.



He-Ping Primary School Wins Hualien Essay Gold Medal

He-Ping primary students discovered the local Little Tern breeding habitat through environmental education. Their essay won the Gold Medal in the 2025 National Online Essay

Competition. Ho-Ping Power Company and Hoping EcoPort employees voluntarily supported their interviews and rehearsals, turning knowledge into real action.

