



ACI ASIA-PACIFIC & MIDDLE EAST  
GREEN AIRPORTS  
RECOGNITION



# GREEN AIRPORTS RECOGNITION 2024

**BIODIVERSITY AND  
NATURE-BASED  
SOLUTIONS**



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## INTRODUCTION AND ACKNOWLEDGEMENTS

The Green Airports Recognition was established by ACI Asia-Pacific & Middle East (APAC & MID) with the support of the ACI APAC & MID Regional Environment Committee. The Recognition's objective is to promote environmental best practices to minimise aviation's impacts on the environment and to recognise ACI APAC & MID's airport members who have outstanding accomplishments in their environmental projects.

Aviation industry closely connected with [Biodiversity](#), which is defined as *the variety of life on Earth and the natural patterns it forms*, in a lot of ways, including loss of habitats with airport infra expansion, adverse noise, and light pollution to wildlife. Operation and expansion of airports shall be considered with the efforts of conserving biodiversity in the precinct of the airports and beyond.

Since 1993, 196 governments/parties have ratified the [Convention on Biological Diversity](#) (CBD), which is an international treaty on the conservation of biodiversity and promoting sustainable development, the conclusion of the UN 15th Conference of the Parties (COP15) to the CBD in 2022 saw the adoption of the Kunming-Montreal Global Biodiversity Framework (GBF).

Amidst a dangerous decline in nature threatening the survival of 1 million species and impacting the lives of billions of people, the GBF aims to halt and reverse nature loss. The framework consists of global targets to be achieved by 2030 and beyond to safeguard and sustainably use biodiversity.

The United Nations Environment Assembly (UNEA) adopted [Nature-Based Solutions \(NBS\)](#) for supporting sustainable development on March 2022, by implementing NBS airports can contribute to land and ocean conservation while enhancing biodiversity airport vicinity with safe operations.

The ACI Asia-Pacific & Middle East Environmental Survey 2023, provided evidence that majority of airports prioritised biodiversity among various environmental aspects. Other findings indicate that more than half of responding airports have direct responsibilities for airport biodiversity, showing a steady increase since 2017. Additionally, the number of airports with a target on biodiversity or a biodiversity strategy/management plan has continuously increased as well. The number of responding airports with High management priority for biodiversity is showing a slow increasing trend.

The GAR 2024 received an overwhelming submissions, showcasing successful case studies and initiatives in their biodiversity preservation and best practices.

This years' submissions include creative and innovative projects, ranging from Plantation for carbon reduction and social benefits, Marine life conservation by airports, Wetland/ecological rejuvenation, In-house airport horticulture and nursery, and Wildlife management for safe operations.



Several outstanding projects were identified at airports, including Hong Kong International Airport, Kansai Airport, Mactan-Cebu International Airport, and Queenstown Airport, have undertaken environmental initiatives to promote marine, coastal, wetland and wildlife conservation.



**Hong Kong International Airport (HKG): Platinum | Over 35 million passengers per annum (mppa)**

Implemented an artificial reef deployment project to benefit marine habitats and fisheries resources. The project “Implementation of Marine Ecology and Fisheries Enhancement Measures,” led to significant growth in marine species, with over five times more species recorded compared to before.

**Kansai Airport (KIX): Platinum | 15 - 35mppa**

Conducted a seaweed bed transplanting initiative, “Creating a rich seaweed bed and blue carbon,” along its coast to establish a biological habitat and carbon sink. By transplanting 35,000 large seaweeds from 2019 to 2022, KIX achieved carbon sequestration credit certification in 2022 for 103.2 tons.



**Mactan-Cebu International Airport (CEB): Platinum | 8 - 15mppa**

Launched a marine preservation commitment, “Coastal Clean-Up” project, collecting 18 tons of solid waste in consecutive clean-up events from April to May 2023. This initiative restored mangrove areas, serving as feeding grounds for migratory birds and reducing plastic pollution in the sanctuary's ecosystem.

**Queenstown Airport (ZQN): Platinum | Less than 8mppa**

Engaged in a 10-year project to conserve biodiversity by replanting native species around “Shotover Wetland restoration”. More than 3,000 native plants have been established, forming a buffer that filters pollutants, mitigates flooding, prevents erosion in the wetland area and provides shelter for bird and fish.



# ACI Asia-Pacific & Middle East Green Airports Recognition 2024



platinum



gold



silver

Over 35 million passengers per annum

Between 15-35 million passengers per annum



Hong Kong International Airport



Kansai Airport



Sydney Airport



King Khalid Int. Airport



Indira Gandhi Int. Airport



Kempegowda Int. Airport

Between 8-15 million passengers per annum

Less than 8 million passengers per annum



Mactan-Cebu Int. Airport



Queenstown Airport



King Fahd International Airport



Darwin International Airport



Chubu Centrair Int. Airport



Chaudhary Charan Singh Int. Airport



ACI ASIA-PACIFIC & MIDDLE EAST  
GREEN AIRPORTS  
RECOGNITION

We would like to thank the panel of judges for their expertise and valuable time, notably:

**Mr. Christopher Paling**, Senior Lecturer in Environmental Management, Manchester Metropolitan University

**Mr. Christopher Surgenor**, Editor/Publisher, GreenAir Online

**Ms. Jennifer Desharnais**, Director, Sustainability and Environmental Protection, ACI World

**Dr. Panagiotis Karamanos**, Aviation Environmental Consultant

**Mr. Stefano Baronci**, Director General, ACI Asia-Pacific & Middle East



## ACKNOWLEDGEMENT OF PARTICIPATING AIRPORTS

All 30 airport operators submitting their projects deserve to be recognised for their commitment to *Biodiversity & Nature-Based Solutions* efforts and willingness to share their stories with the airport community, fully reflecting the objective of this recognition.



## IN-HOUSE AIRPORT HORTICULTURE AND NURSERY



### **Indira Gandhi International Airport Center of Excellence – Biodiversity Center**

Delhi International Airport (DIAL) aims to develop a long-term sustainable biodiversity plan that is compatible with the safe operations and development needs of the airport. One of our strategic initiatives is to advocate for the concept of green airport space. Biodiversity at our airport has three key elements i.e. plantations, landscaping, and wildlife management.

To manage the three key elements of biodiversity, we have created the Center of Excellence – Biodiversity Center which contributes significantly to environmental conservation, carbon offsetting, public education, aesthetic enhancement, and research innovation. Center spreads across >400,000 sq. feet and houses >1.26 lakhs<sup>1</sup> of indoor plants, two lakh flowering and foliage plants, including about 40,000 Chrysanthemums and >60,000 potted seasonal flowers yearly.

The centre serves as an invaluable source of native plant species, helping to preserve and propagate a diverse range of flora. Cultivating indigenous plants within airports, safeguards endangered species and promoting genetic diversity is crucial for ecosystem resilience. It also aids in restoring and enhancing degraded habitats, contributing significantly to ecosystem regeneration.

To ensure favourable growth, the temperature and humidity inside the nursery are managed by a digitally controlled cooling fan & pad system supplemented with automatic fogging and irrigation systems. Two new houses with modular sprinklers and foggers, covered with aluminate, and two poly houses with dual coverage of five-layered special polyethylene sheet and aluminate. The vermi-compost unit is also operational. We avoid fruit-bearing trees to accommodate aircraft operational safety. It has more than 220 trained gardeners, supervisors, and horticulturists. Rainwater harvesting structure and Air Quality Monitoring station is also part of this centre.

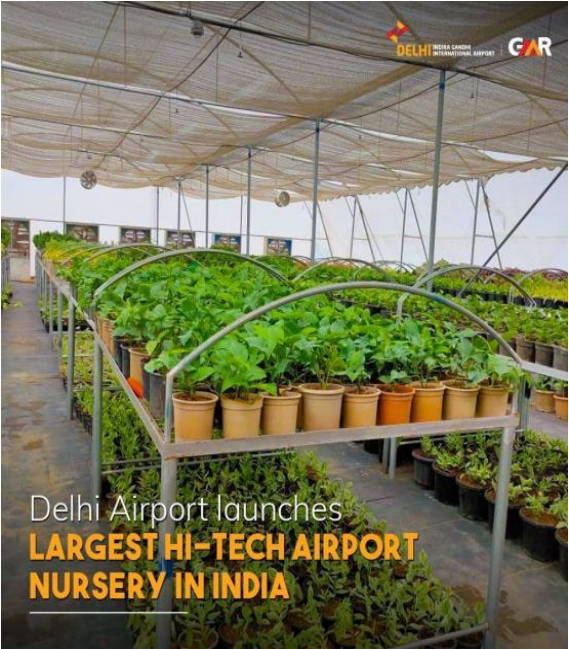
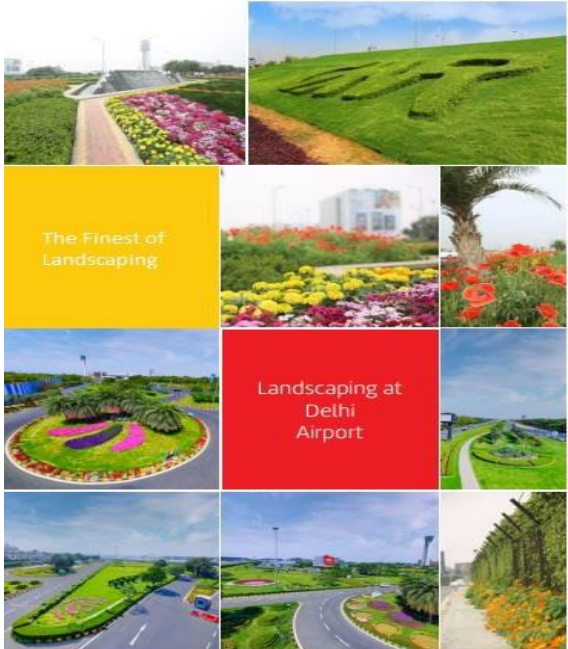


The centre represents a holistic approach toward sustainable airport biodiversity management, aligning aviation activities with ecological preservation and community engagement for a more environmentally conscious future.

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<sup>1</sup> Lakhs: 100,000



Project Graphics

<p>Largest airport Nursery</p> 	<p>Delhi Airport exterior landscaping</p> 
<p>Delhi Airport indoor landscaping</p> 	<p>Ideal Environment to sustain biodiversity</p> 

## IN-HOUSE AIRPORT HORTICULTURE AND NURSERY



مطار الملك عبدالعزيز الدولي  
King Abdulaziz International Airport

### King Abdulaziz International Airport Vegetation initiative

This executive summary highlights the significant benefits that can be derived from the presence of 3 million square meters of vegetation at airports in promoting biodiversity. Airports have the potential to contribute to environmental sustainability. The following key points outline the benefits of vegetation at airports to biodiversity:

**1. Enhanced Habitat Creation:** 3 million square meters of vegetation within airport premises provides opportunities for the creation of diverse habitats. These habitats can support a wide range of plant and animal species, including both native and migratory species. By providing suitable vegetation cover, food sources, and nesting sites, airports can contribute to the establishment of sustainable habitats that promote biodiversity.

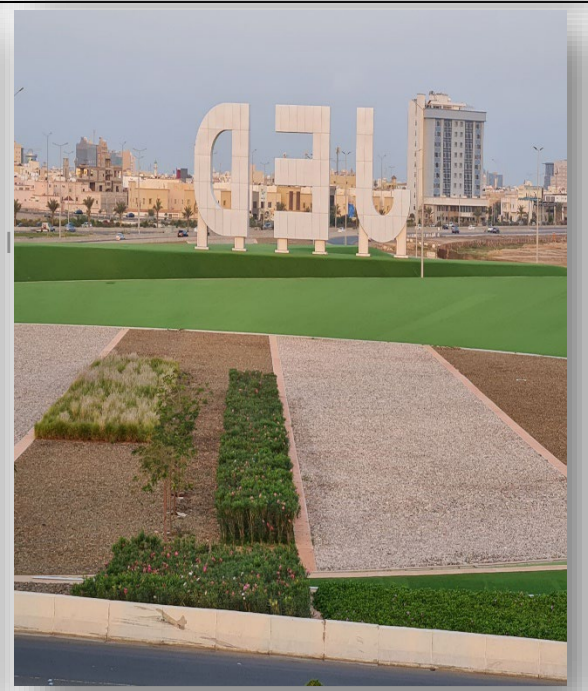
**3. Wildlife Conservation:** The presence of vegetation at airports offers opportunities for wildlife conservation. Native plant species that are well-suited to the local environment can be incorporated into landscaping plans, attracting a variety of wildlife. This includes pollinators, birds, small mammals, and other organisms that contribute to the overall biodiversity of the area. By providing suitable habitats and food sources, airports can support the conservation of wildlife populations.

**4. Stormwater Management:** Vegetation plays a vital role in stormwater management by absorbing and filtering rainwater. The incorporation of 3 million square meters of vegetation at airports can help reduce stormwater runoff and mitigate the risk of flooding. This natural infrastructure can contribute to the protection of surrounding ecosystems and water bodies, ensuring the preservation of water quality and aquatic biodiversity.

**5. Carbon Sequestration and Air Quality Improvement:** Vegetation acts as a carbon sink, absorbing and storing atmospheric carbon dioxide. By incorporating 3 million square meters of vegetation, airports can contribute to carbon sequestration efforts, helping to mitigate climate change. Additionally, vegetation plays a crucial role in improving air quality by filtering pollutants and particulate matter, thus benefiting both biodiversity and human health.



## Project Graphics



## IN-HOUSE AIRPORT HORTICULTURE AND NURSERY



### **Kempegowda International Airport**

#### **Nature based holistic approach for Sustainable Future**

Kempegowda International Airport, Bengaluru (KIAB) is one of the fastest growing Airports in the world, with an annual footfall of around 32 million passengers (2022-23).

Our Sustainability Vision: Touch lives by nurturing a sustainable future through initiatives that drive economic, social, and environmental transformation.

Management Vision for the Sustainable Future had motivated us to conceptualize this project. The application of the project and the integrated multipronged approach makes it unique.

The project was funded by the Bangalore International Airport Limited (BIAL), covering Biodiversity & Green Landscape with water positivity.

Our Sustainable future initiatives were carefully designed in harmony with nature and to co-exist with the nature, utilising naturally available resources benefitting the stakeholders including community.





At the heart of BIAL's sustainability efforts lies the brand-new Terminal 2, meticulously designed to seamlessly integrate with nature. Aptly named the 'Terminal in a Garden', it stands as a biodiversity hotspot, adorned with 600 to 800-year-old trees, 180 rare and endangered species, and bamboo cladding. This unique terminal is a tribute to the Garden City of Bengaluru, mirroring the environment of a garden with 0.6 million plants sourced from ten ecological habitats across the country.

KIAB has a water positivity index of 2.36. Innovative weather-based smart automatic irrigation system manages the sprawling 100-acre landscape efficiently. Active, Beautiful, Clean (ABC) concept for rainwater harvesting significantly reduces the eutrophication. ABC design methods, Raingardens, Biotopes are constructed around the harvesting ponds which helped the harvested water free of impurities. Nutrients like nitrogen and phosphorus from the storm water is absorbed by the plants installed on rain gardens and Biotopes.

We aim to serve as an inspiring model for airports worldwide, demonstrating that sustainability and operational excellence can harmoniously coexist. KIAB will continuously strive to offer a brighter and greener future for all.



Project Graphics

Green Landscape with Biodiversity	Biodiversity Water Ponds with ABC design
	
Biodiversity Green Landscape with WaterPonds Devanahalli Pomello Geo tagged local fruit	Biodiversity nursery with ponds. Post acclimatisation sent to terminal green landscape. *Google Earth
	

## IN-HOUSE AIRPORT HORTICULTURE AND NURSERY



### **Lokpriya Gopinath Bordoloi International Airport Flora and Fauna Restoration**

We have developed 7-acre landscape at Guwahati international airport. Successfully developed a 1.5-acre industrial polyhouse nursery, a haven for 2 lakhs<sup>2</sup> thriving plants, marking a pioneering achievement in the northeastern region. At the airport entrance, a 300 sqm area unveils a mesmerising green wall, a living canvas showcasing diverse plant species, offering a warm welcome to passengers. The green wall at the entrance serves as a living emblem of your commitment to sustainability. It not only adds a touch of elegance to the airport but also functions as an educational tool, raising awareness about the importance of green initiatives. Passengers passing through are not just travellers; they become witnesses to a conscientious effort to bring nature into the heart of urban spaces.

The meticulous landscaping extends to the 1.5-acre sewage treatment plant (STP) area, where functionality meets aesthetics. The STP area is transformed into a picturesque landscape, harmonizing the essential infrastructure with natural beauty. It is a testament to your commitment to sustainability and environmental consciousness.

As travellers make their way along the airport exit road, they are treated to a breathtaking 2-acre garden dedicated to Assam's rich flora and fauna. This botanical haven not only serves as a visual delight but also stands as a tribute to the region's unique biodiversity. Each corner tells a story, weaving together the vibrant tapestry of Assam's ecological heritage. The meticulous attention to detail is evident in the strategic placement of plant varieties, creating a sensory experience for visitors. Fragrant blooms, textured foliage, and a kaleidoscope of colours harmonize to form a living symphony that resonates with the natural rhythm of the region.

The Assam flora and fauna garden along the exit road is a testament to our dedication to preserving the region's biodiversity.

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<sup>2</sup> Lakhs: 100,000



Project Graphics

Entrance to the airport	In house Nursery
	
Landscape Development	Green theme park
	



## IN-HOUSE AIRPORT HORTICULTURE AND NURSERY



### **Mangaluru International Airport Landscape Development Project**

Mangaluru International Airport Limited (MIAL) signed a concession agreement with Airports Authority of India (AAI) to operate, maintain, manage & develop Mangaluru International Airport. MIAL commenced operations from October 31, 2020.

MIAL being an environmentally responsible organisation, has initiated several initiatives to establish the environment management system and sustainability.

MIAL has initiated the "Landscape Development Project" to improve plantation and landscape of the airport. Green development in airport offers environmental, economic, and social benefits. It reduces carbon emissions, preserves biodiversity, and enhances the overall sustainability of the air travel. Additionally, leads improved air quality and increased community engagement.

As part of this project, we have identified various locations of Airport such as open spaces and areas with less plantation, areas where beautification through landscaping can be done.

The following actions has been Implemented:

- Clearance of wild vegetation, removal of stones and other waste material was carried out from the identified locations.
- Removed old soil from identified landside locations.
- Red fertile soil and organic compost were purchased. Mixture of this red fertile soil was applied on the identified locations.
- Identified 48 numbers local species talipot palm, ficus, badam, acacia, creepers and wines, climbers, bamboo, flowering, and foliage plants & shrubs.
- As a part of this project, MIAL has developed 13,200 Ha of landscape area consisting

Total lawn area = 7,730 Sq.m planted with grass.

Shrubs area= 4488 Sq.m area, consisting 43 numbers of flowering plant/shrubs species and 48 number of foliage plant species.

Local tree species & Palms area = 982 Sq.m. Number of Palms planted are 107 no.s and local tree species planted are 602 numbers with 48 no.s of different species

- Pesticide usage is avoided which has potential of bioaccumulation in food chain of the birds and other ecosystem.
- No net loss to biodiversity by 2030 will be achieved.

Project Graphics

<p>Development of landscape at landside area</p>	<p>Development of landscape at landside area</p>
<div><p>Before</p></div> <div><p>After</p></div>	<div><p>Before</p></div> <div><p>After</p></div>
<p>Development of landscape at landside area and terminal Building</p>	<p>Plantation at landside along with stakeholder and distribution of GI tagged Udupi Jasmine (<i>J.sambac</i>) sapling to passengers as a measure to conserve this rare local species</p>
<div></div> <div><p>Foliage and flowering plants at Terminal Building shrubs</p></div>	<div><p>World Environment Day Plantation</p></div> <div><p>Distribution of saplings to passengers</p></div>

## IN-HOUSE AIRPORT HORTICULTURE AND NURSERY



### **Manohar International Airport**

#### **Preservation of 195 acres Natural Habitat and collaborative afforestation with local community**

Manohar International Airport (GOX), operated & maintained by GMR Goa International Airport Limited (GGIAL) started the scheduled commercial operations from 5th January 2023.

The airport is located on a table-top plateau surrounded by natural forests adjoining the Northern and Eastern boundary. There are wetlands and shallow lakes at foothills of the airport.

Out of 2132 acres of total airport land (Right of Way), ~ 195 acres of land (~ 9.14 % of total airport land) with existing Natural Habitat and natural tree cover consisting of native forest tree species viz., Matti (*Terminalia Crenulata*), Vad (*Ficus Bengalensis*), Pipal (*Ficus Religiosa*), Moi (*Lennea Coromandelica*), Kajro (*Strychnos Nuxvomica*), Ghoting (*Terminalia Bellerica*), Sawar (*Bombax Ceiba*) etc. have been preserved as it is in its natural state. Further, during airport project construction phase, 500 nos. of indigenous tree species were also transplanted from project construction area to the preserved land of 195 acres.

GGIAL in collaboration with Goa State Biodiversity Board (GSBB), State Government of Goa (GoG), distributed 6,39,278 nos. tree saplings across Goa State till now. This collaborative plantation initiative started from year 2019 involving Village-level Biodiversity Management Committees (BMC), across various villages in Goa. Grass root volunteers viz., farmers, cash crop cultivators, general villagers, etc. are the members of village-level BMCs.

The tree saplings such as cash crops like cashew, areca nut, fruit bearing trees and native forest species are distributed to locals through these village-level BMCs. The tree species are procured from nurseries of Department of Forests, GoG. This joint 'Corporate & Government' approach has evolved as the People Movement. Both GSBB & GGIAL teams conduct Quarterly joint site inspection to these sites to monitor progress. Since grass-root level people are involved, tree survival rate of > 80% has been achieved.



Project Graphics

<p>Preserved Natural Habitat land on N-W zone and Dense tree cover surrounding Manohar International airport.</p>	<p>Distribution of tree saplings to villagers through Bio-diversity Management Committees in collaboration of Goa State Bio-diversity Board, Government of Goa.</p>
	
<p>Translocation of Trees</p>	<p>Translocated trees in 'Preserved Land'</p>
	

## IN-HOUSE AIRPORT HORTICULTURE AND NURSERY



### **Netaji Subhas Chandra Bose International Airport Green Initiative at NSCBI Airport, Kolkata**

India is one of the largest domestic aviation markets in the world and handles the third largest domestic traffic. Airports Authority of India (AAI) is India's leading airport operator and sole air navigation service provider. AAI is committed to conserve the environment and resources. AAI has framed the "Environment Policy" to achieve the sustainable development by implementing cost effective carbon mitigation actions to preserve the environment.

For managing biodiversity, AAI has developed huge landscape area at airport. The plants or tree species which are part of landscaping are mostly native to geography and selected in a manner that they reduce air, water or soil pollution or absorb noise to a large extent.

As a part of "tree plantation drive" we have planted more than 10,000 trees/plants (Big & small) within airport boundary and further planning to add more trees shortly. The entire landscaping is irrigated with treated waste water.

We have adopted wildlife management and conservation techniques to minimise the risk of bird strikes and improve the safety at airport. We ensure no use of pesticides to prevent the hazard to birds and maintain soil fertility.




With these initiatives, AAI continuously focus on biodiversity management and ensure safe operation at airport.

#### ☐ The tree plantation project's results and benefits

1. Reducing Climate Change
2. Purifying Air
3. Cooling Down the cities / streets by up to 10 F by providing shade and releasing water
4. Natural Air Conditioning
5. Saving Water
6. Preventing Water Pollution
7. Providing Shelters for Wildlife
8. Reinforcing Soil
9. Erosion Control



Project Graphics

Operational Building	In front of T-2 (city side)
	
Road towards t-2	
	
New service yard	
	

## IN-HOUSE AIRPORT HORTICULTURE AND NURSERY



### **Rajiv Gandhi International Airport**

### **Optimising Biodiversity and Carbon Removal through Sustaining Natural Ecosystems at RGI Airport**

Biodiversity – the variability of life on Earth with the support of biotic and abiotic components. This diversity is the basic principle of the earth existence and survival of millions of floras and fauna. Here, ecosystems purify the air and water that are the basis of life.

Anthropogenic activities are destroying the ecosystems and degrading the biodiversity, which is preventable. In 1992, the Convention on Biodiversity was signed by 150 countries for conservation of biodiversity, sustainable use of the components and sharing the benefits.

GMR Hyderabad International Airport Limited (GHIAL) considers ecosystems protection and biodiversity preservation as important sustainability objectives at Rajiv Gandhi International Airport (RGIA).

RGIA in semi-arid climatic zone of the Indian subcontinent, a green-field airport with diversified natural flora and fauna. GHIAL believes in the government of India's biodiversity slogan - Nature Protects, If She is Protected.

RGIA community observes May 22, International Day for Biodiversity. In 2023, the airport stakeholders promoted the theme: From Agreement to Action: Build Back Biodiversity.

GHIAL has been conserving nature amid continuous development of the airport through:

- Partnering with the Airport community.
- Sustaining terrestrial ecosystem with native species.
- Bio-swales for collection of stormwaters.
- Greenbelt development as carbon sink.
- Aquatic ecosystems through creating reservoirs.
- Eco-friendly waste management to prevent land and water contamination.
- Periodical assessment of the flora and fauna species and habitats.

Results:

1. Carbon removal by trees: Total 3,461 tonnes of CO<sub>2</sub> in the last five years naturally.

2. Biodiversity at the Airport


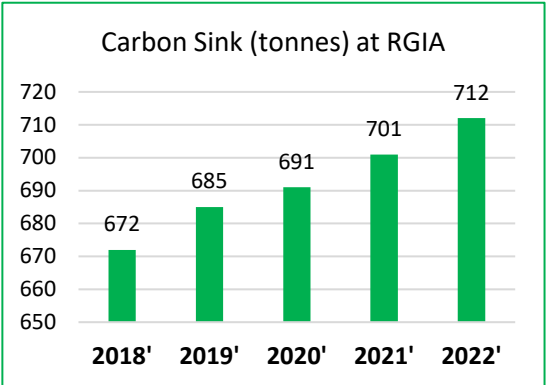



- Flora: 184 Species- Plants
- Fauna: 191 species-birds; 17 species-snakes; 66 species-butterflies; 21 species-mammals and amphibians.

3. Groundwater is at 3.5 to 19.0 m, which is low level comparatively city due to 4 reservoirs.

GHIAL's ecosystem and biodiversity practices are aligned with United Nations Sustainable Development Group (UNSDG) 15: Life on Land and UN Biodiversity Agreement held during COP 15 (UN 15th Conference of the Parties) 15 in 2022.



Project Graphics

<p>Bio-swale along 8.5-kilometre airport road</p> 	<p>Carbon removal through well grown Trees</p>  <table><caption>Carbon Sink (tonnes) at RGIA</caption><thead><tr><th>Year</th><th>Carbon Sink (tonnes)</th></tr></thead><tbody><tr><td>2018'</td><td>672</td></tr><tr><td>2019'</td><td>685</td></tr><tr><td>2020'</td><td>691</td></tr><tr><td>2021'</td><td>701</td></tr><tr><td>2022'</td><td>712</td></tr></tbody></table>	Year	Carbon Sink (tonnes)	2018'	672	2019'	685	2020'	691	2021'	701	2022'	712
Year	Carbon Sink (tonnes)												
2018'	672												
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2022'	712												
<p>Airport Biodiversity Zone on Google map Comparison between 2023 and 2008 years</p> <div><p>2023 – Enhanced Greenery with Biodiversity</p><div><div></div> RGI Airport Boundary Wall</div><div><div></div> Biodiversity Zone at the Airport with vegetation and reservoirs</div></div> 	<p>Reservoirs for aquatic ecosystem and groundwater recharge.</p> 												

## IN-HOUSE AIRPORT HORTICULTURE AND NURSERY



### **Sharjah Airport the Green Oasis Project 2021**

As a part of Sharjah airport's continuous efforts to develop and maintain a green habitat in and around, the Airport Green Oasis Project 2021 was implemented. The project started in September 2021 and was completed by end of November 2021. The project includes the development of a green area near ADNOC fuel station and police air wing areas of Sharjah airport.



The project was planned and implemented by the Gardening unit of Airport Facilities department. The project includes a total of 5,123 M2 of green grass and shrubs, plants, and trees. The purpose of the project is to develop a natural habitat around the airport through building a green area on the landside of the airport, which improves the local air quality and provide other environmental benefits. The project will be a nature-based solution to carbon emissions and act as a carbon sink.

The project was a part of Sharjah Airport's green habitat initiative as per Sharjah airport management decision to develop and maintain a green area in and around the airport in line with its strategic objectives of Environment and sustainability.

Sharjah Airport green habitat initiative currently amounts to a total of 51,770 M2 of green grass area, 1,760 M2 of Pentium grass, 5,360 damas trees, 248 palm trees, 153 washingtonia trees, 72 ghaff trees, 3,932 other trees and shrubs, 2017 indoor plants and 1,685 M2.

The whole plantation and its effective maintenance ensure a natural habitat around Sharjah Airport and improved local air quality and act as a natural carbon sink and provide other environmental benefits such as protection from soil erosion, land contamination, etc.

Project Graphics

<p>Project area after completion</p> 	<p>Project area after completion</p> 
<p>Levelling and Plantation</p> 	<p>Irrigation installation</p> 



## IN-HOUSE AIRPORT HORTICULTURE AND NURSERY



### **Thiruvananthapuram International Airport**

#### **Tree Transplantation of 40 trees from City Side Development Area to Green Belt Area of Terminal 02, Thiruvananthapuram International Airport**

Urbanisation and development are inevitable parts of modern age, but this comes at the cost of losing green cover. Planting trees is necessary to maintain a carbon sink and to replace trees that have been removed or lost due to natural mortality or other challenges like construction, impacts from adverse weather conditions such as storms, wind and drought, invasive pests, etc. Tree transplantation is a process of unearthing the trees and replanting them from their parent locations to new locations with the objective of regrowing the trees at new locations.

The key concern remains protecting the root ball while pruning the wider roots. The process involves great engineering and arborist skills to make it work effectively. It also requires a substantial number of resources and time.

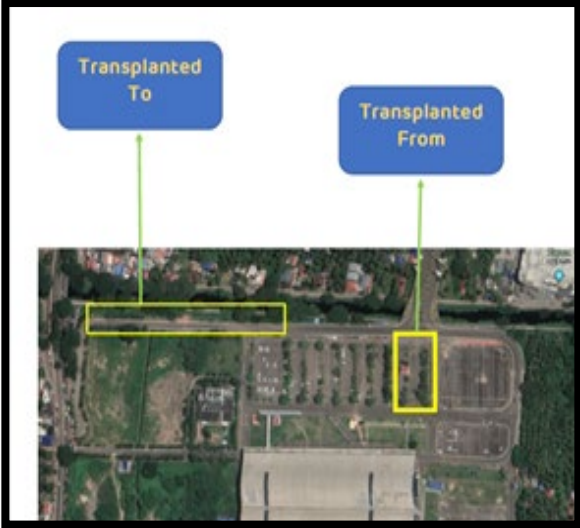







Forty trees that were formerly positioned in the parking lot of terminals 2 at the Thiruvananthapuram International Airport were moved to the green belt area. Twenty trees were transplanted in the first set in the month of February 2023 and followed by another 20 trees in the month of May.

Each tree's height and girth were measured and recorded. First, the tree branches were clipped, and then the method for digging a pit was carried out. Following the excavation of the pit, the roots are treated with fungicide and rooting hormone before being burlapped with cocopeat.

To make root burlaps, gunny bags are used. The trees are stacked with wooden poles to prepare them for transplanting and kept for about 45 days to establishing fresh roots; Prior to transplantation, the pits are sufficiently stocked with organic manures.

After carefully positioning the trees, the pits were covered, and the trees were stacked with wooden poles. This process of conserving trees and undertaking plantation activities are part of our no net loss plan by 2029.

Project Graphics

Tree Transplantation Location Google Snapshot	Existing Trees to be transplanted
	
Tree Transplantation Process	Tree Transplanted Location
<div><p>Application of fungicide to exposed roots</p><p>Application of root hormone to exposed roots</p><p>Cocopeat smearing before root burlapping</p><p>Root burlapping with gunny bags and staking of tree- Tree ready for transplanting</p></div>	<div><p>Tree Transplanted on February 03, 2023 – At present</p><p>Tree Transplanted on May 14, 2023</p></div>

## PLANTATION FOR CARBON REDUCTION AND SOCIAL BENEFITS



### **Chaudhary Charan Singh International Airport Moringa Plantation**

We, Lucknow International Airport Limited (LIAL) strongly believe that the sustainability of our business is intricately linked with the ecosystem, we operate in. Protecting and enhancing biodiversity is an integral part of our commitment to sustainable development. Integrating the need for biodiversity conservation into the operational decision-making process and taking measures to minimise impacts is a commitment across our airport business.

We believe that trees are an important part of healthy ecosystems. By planting trees, we can help in conserving the biodiversity and support healthy and resilient ecosystems. Lucknow International Airport Limited, which operates, manages, and is developing the Chaudhary Charan Singh International Airport has planted 25,000 nos. saplings of Moringa in nearby villages. We embarked on this plantation drive on January 2023 and completed it in October 2023.

Firstly, we identified locations for the plantation of Moringa saplings in the vicinity of the airport. We discussed about the medicinal benefits of the tree with local farmers and villagers. We also imparted training to local villagers about the use of leaves as well as the fruit (also known as drumstick) of Moringa tree.

Further to which, we developed the saplings over a period of five months at nurseries in the respective villages. We started the planation of the saplings in rainy season i.e. July 2023 and completed the drive in October 2023. We were able to successfully plant 25,000 saplings across locations.

Also, we at a Portfolio level have pledged to grow 100 million trees by 2030 “Trillion Trees Platform” of the World Economic Forum at Davos in January 2023. This is the largest pledge by an Indian corporate and among the most ambitious corporate pledges globally. At, Chaudhary Charan Singh International Airport, around 5,000 trees have been planted so far.



Project Graphics

Moringa sapling development	Plantation in nearby community
	
Plant in growing stage	Grown Plant as on date
	

## PLANTATION FOR CARBON REDUCTION AND SOCIAL BENEFITS



### **Chhatrapati Shivaji Maharaj International Airport Plantation by Miyawaki method**

Mumbai Airport International Limited (MIAL), emphasises equally on all aspects of Environment Management, throughout its operations. As global warming is soaring day by day, the earth is facing the resultant impact of climate change on ecosystems, biodiversity and livelihoods of people, and risks to various business operations. Minimising global warming can reduce the environmental impact, ensuring the sustainability of people, economies, and ecosystems across the world. Hence, MIAL engages with relevant stakeholders to assess the risks on business operations due to climate change and threats to the ecosystem.

Accreditation by multiple prestigious organisations is a testimony to our work towards Environmental and Social stewardship.

As committed in the ESG frameworks, one of our goals is “no net zero loss to biodiversity.”

The MIAL is situated in the heart of Mumbai city and has a space constraint for biodiversity projects implementation. To overcome this constraint, the MIAL has proactively taken a project on “Miyawaki Plantation” outside the airport premises to protect biodiversity and make efficient use of the available land.




This apart, the MIAL has also converted around 80000 sq. m. of the land within airport premises into green areas, especially conserving around 136 species of trees, podium garden and a green wall. The entire area is maintained through or by nature-based solutions.

This initiative achieved the following key results,

- Stakeholder Engagement.
- Conservation of land by avoiding soil erosion.
- Miyawaki plantation- a natural habitat to the native birds.
- The conservation of water by around 50% due to drip irrigation.
- Elimination of Chemical based pesticides.
- Conservation of around 136 species of plants.



Project Graphics

Plantation Stage - Miyawaki Plantation	Growth Stage- Miyawaki Plantation
	
Plantation within the premises of Airport	Green Walls in the Airport
	



## PLANTATION FOR CARBON REDUCTION AND SOCIAL BENEFITS



### Jaipur International Airport

#### Developed Mini Forest (Vriksh Kunj Theme Forest) in Jaipur

**Developed and maintaining a Mini Forest under Vriksh Kunj – a theme by state forest department - and simultaneously made a natural pond:** Jaipur Airport has developed a mini forest of over 4,000 saplings of different local species and made a natural pond for rainwater harvesting and recharging at Bichun in Jaipur.

Vriksh Kunj is special initiative by Government of Rajasthan which aims at conservation of flora and fauna, increasing green cover and promoting awareness for environment conservation in and around Bichun area by planting of sapling of different species.

The reason for selecting Bichun area for developing mini forest is its proximity to renowned Sambhar Lake (recognized wetland to international importance). The wetland is a key wintering area for thousands of pink flamingos and other birds that migrate from Northern Asia and Siberia.

Project details:

- Project Name: Developed Mini Forest and maintain.
- Area of plantation: 10Ha
- No of Plants: 4000
- Project Cost: 95.80Lacs
- Project Period: 5 Year (1 year plantation + 4-year maintenance)
- Location: Bichun (Jaipur, Raj.)

This initiative achieved the following key results:

- ✓ Conservation of local flora and fauna
- ✓ Adoption of conservation planning to mitigate degradation factors and maintain such area.
- ✓ Ameliorate local weather conditions and buffer ambient temperatures.
- ✓ Promote ecotourism and social connectivity across the urban community.
- ✓ Represent unique ecological models processing not only wildlife and natural values but also aesthetic, environmental, and educational values.

Selection of species for plantation

The species of the samplings selected for plantation drive were selected after the thorough study of the nature of the soil, weather condition, availability of water-(*azadirachta indica*, *Ficus benghalensis*, *Ficus religiosa*, *Phyllanthus emblica*, *Ziziphus mauritiana*, *Aegle marmelos*, *Delonix regia*, *Cassia fistula*, *Prosopis cineraria*, *Dalbergia sissoo*, *Terminalia arjuna*, *Tamarindus indica* etc.)

## Project Graphics

Land Preparation & 6 feet high wall fencing	Plantation & Irrigation photographs
	
Developed Earthen Pond for Rainwater Harvesting & Recharging	Media Coverage of planation activates
	

## PLANTATION FOR CARBON REDUCTION AND SOCIAL BENEFITS



### King Fahd International Airport

#### **"Our Airport is Green"**

Dammam Airport, in a visionary response to the urgent call for environmental sustainability in the aviation industry, has embarked on an ambitious and pioneering initiative titled "Our Airport is Green". This project, harmoniously aligned with the themes of the Saudi Green Initiative, the Middle East Green Initiative, and the objectives of the COP28 conference, is a testament to Dammam Airport's commitment to biodiversity and nature-based solutions. The initiative's primary goal is to plant one million trees around the airport, creating a green oasis.

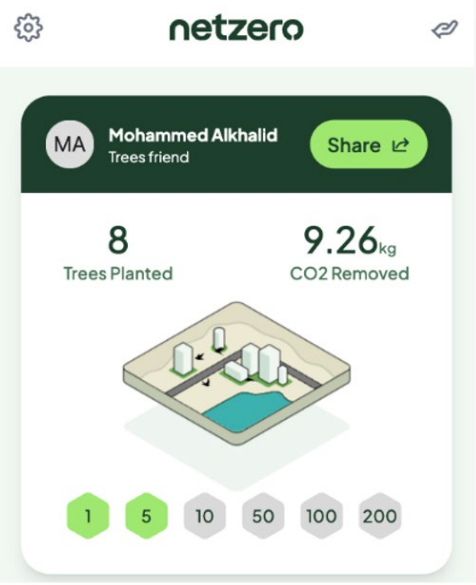

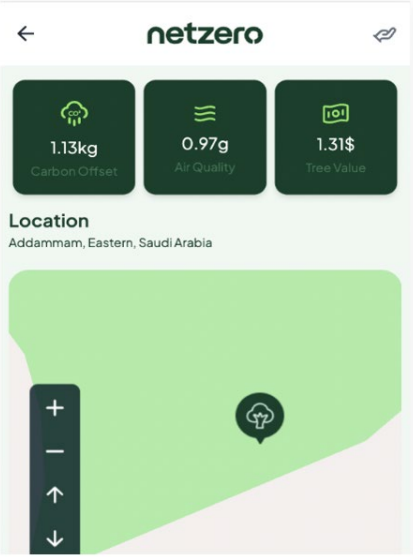

Launched with the planting of 10,000 trees at its inauguration, this initiative is not just about transforming the physical landscape but also about revolutionizing the airport's ecological footprint. It represents a holistic approach to sustainability, aiming to offset the carbon emissions generated by airport operations and contribute to biodiversity enhancement in the region. The initiative is designed to establish a vibrant ecosystem, supporting various flora and fauna, and enhancing the natural beauty of the airport's surroundings.

Its focus is on traveler engagement. "Our Airport is Green" invites travelers to be active participants in the airport's greening efforts, thereby fostering a sense of environmental stewardship and community. This engagement is facilitated through interactive platforms that allow travelers to track the growth and ecological impact of the trees they have contributed to planting.

Dammam Airport, through this initiative, positions itself as a leader in innovative, nature-based solutions in the aviation industry. The project is a stride towards achieving net-zero carbon emissions, enhancing local biodiversity, and improving the overall environmental quality of the airport and its surrounding areas. By integrating green spaces, promoting biodiversity, and actively involving its travelers in these efforts, Dammam Airport is setting a new standard in sustainable aviation, making it a deserving candidate for the Green Airports Recognition by the Aviation Council International.



Project Graphics

<p>The interactive platform that is used with our partners that enables passengers to accumulate trees planted in their name and be able to share and interact with them.</p>	<p>Passengers are able to see each tree individually and see its environmental Impact and even share it in social media. Our partner launched this product in partnership with the airport.</p>
	
<p>Passengers are able to zoom close enough to know where their tree is exactly planted and can visit them in the airport boundary. And they can even chat with it remotely.</p>	<p>"Grounded in sustainability, CEO of DACO, and CEO of Netzero, join hands with community leaders in planting the future—one tree at a time—at the inaugural event of the 'Our Airport is Green' initiative."</p>
	

## PLANTATION FOR CARBON REDUCTION AND SOCIAL BENEFITS



### **King Khalid International Airport Plantation Project**

RAC (Riyadh Airports Company)'s flagship "Plantation Project" is an impressive example of a nature-based solution designed to combat desertification both within and beyond King Khalid International Airport's (KKIA) boundaries. This is a green planting programme conducted on a massive scale, with a dedicated airport nursery producing over one million products, including trees, 700,000 flowers and 250,000 seedlings annually.





The resulting green landscapes play a critical role in reducing the temperature within and around the airport and supporting biodiversity in otherwise barren areas, almost devoid of life. Most notable are the expansive green avenues of carefully chosen trees and plants along all the main access routes to the airport. Palm trees have been minimised, because of their high water demands. Instead, more drought resistant, biodiversity friendly varieties chosen to deliver a sustainable ecosystem that had previously been just desert. Due to the numbers at hand the program serves as a carbon sink.

Within the terminals themselves, are over half a million indoor plants across all locations, creating a welcoming environment and contributing to improved indoor air quality enhancing passenger experience.

An important aspect of "Nature Based Solutions" is to conserve, restore, sustainably use, and manage natural resources. This project has many examples. The "state of the art" Sewage Treatment Plant (STP) is the main source of irrigation water, producing an amazing ~2 million m<sup>3</sup> annually.

Soil is an essential input in supporting such a vast programme. Surrounded by desert, fertile soil is a rare resource, so there are two important initiatives that ensure a plentiful supply of this key resource. An impressive composting programme provides compost for the plantation of 1,000 trees. Also, soil sterilisation is used to efficiently recover and reuse soil from seasonal or annual planting, ensuring that disease and pests do not proliferate. When mixed with the "live" organic compost, a perfect, sustainable growing medium is produced.

Project Graphics

CEO and Staff Plantation event during Environment Week 2023	Infill Planation
	
Green belt	Nursery
	



## PLANTATION FOR CARBON REDUCTION AND SOCIAL BENEFITS



Muscat International Airport  
Gateway To Beauty & Opportunity

### **Muscat International Airport Plantation of 10000 trees**

The Muscat Airport planting initiative, which was launched in January 2023, aims to plant 10,000 trees by the end of 2024 strategically within the airport's vicinity.

The project addresses environmental challenges, focusing on improving air quality and carbon offsetting. While ensuring smooth running of airport operations, it engages various stakeholders and mobilizes collaborative support.

The funding is a joint effort, and by December 2023, 3,000 trees have been successfully planted, supported by their registration with the Environment Agency. Achievements include improved air quality, carbon sequestration, and positive community engagement.

The project is characterised by environmental awareness, senior management support, cost-effective strategies, and comprehensive stakeholder engagement, demonstrating a successful and impactful sustainability initiative.

#### Project Achievements

- ✓ Tree Planting: The initiative successfully planted 3,000 trees by December 2023, marking a significant step toward the ambitious goal of 10,000 trees.
- ✓ Air Quality Improvement
- ✓ Carbon Sequestration: The project contributes to carbon offsetting
- ✓ Community Engagement: Community involvement is evident through active participation in tree planting events, workshops, and awareness campaigns. Surveys and testimonials from local residents showcase the positive impact on community relations and environmental awareness.

## Project Graphics

<div><div>The first registration to plant 1000 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## PLANTATION FOR CARBON REDUCTION AND SOCIAL BENEFITS



### **Queen Alia International Airport Protect Aleppo pine trees at Dibeen Forest Reserve**

In 2023, Airport International Group (AIG) collaborated with The Royal Society for the Conservation of Nature <sup>3</sup> (RSCN) as one of national NGOs that has dedicated itself to establishing and managing several protected areas in Jordan, for planting 300 Aleppo Pines in one of the reservation areas in Jordan named “Dibeen Forest Reserve ”

Dibeen Forest Reserve is a nature reserve located in the north-west of Jordan. It is situated just south of the Roman site of Jerash and covers an area of 8.5 square kilometres (3.3 square meter), of rolling hills covered with pine–oak habitat. This area houses the largest Aleppo Pines one of the oldest and naturally grown habitats in Jordan.

Dibeen forest is representative of the wild forests that once covered much of the country's northern frontiers, which now account for only 1% of Jordan's land area. Despite its small size, Dibeen contains one of the last remaining of a pine–oak forest in the Middle East. The species of the reserve's trees vary with elevation; Aleppo Pines inhabit the lower altitudes, the mixed pine–oak woodland (comprising Aleppo Pine and Palestine Oak) grows in the middle, and a species of small deciduous oak (the Aleppo, or Cyprus, Oak) that grows at the higher altitudes.

Beside that Dibeen was ranked as the top priority site for conservation in the 1998 Protected Areas and supports at least 17 threatened species.

Also, the community living at Dibeen believes that working in the field of environment should be based on a participatory approach with local, national, regional, and global alliances such as the Arab Network for Climate Change and Habitat International Convention (HIC). Dibeen considers its membership in one of the most important of these partnerships, as a strong alliance working for the land and the human rights of communities.

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<sup>3</sup> <https://www.rscn.org.jo/>



## Project Graphics

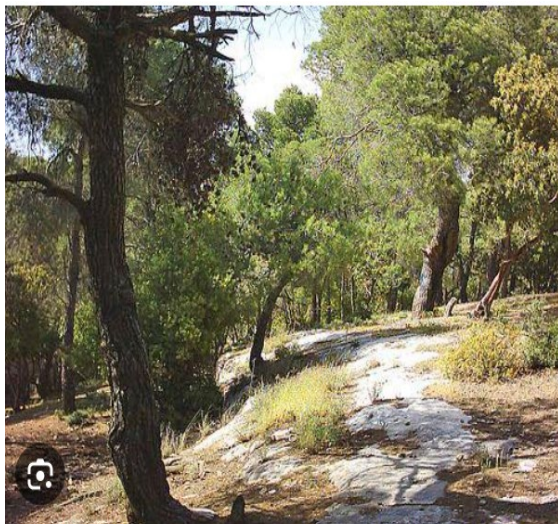
### AIG campaign



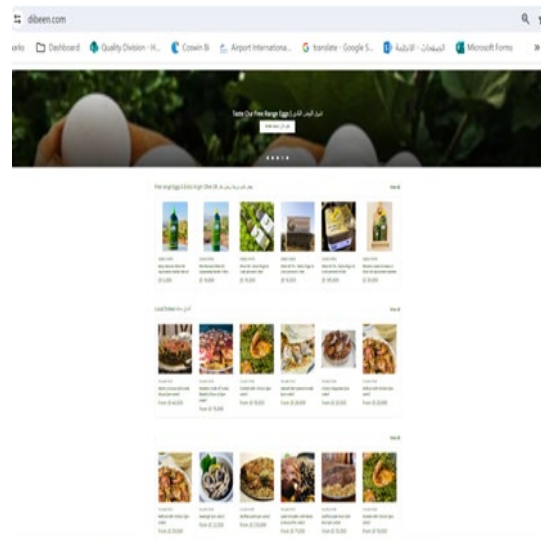
### Example of Airport Stakeholders Engagement JORAMCO



### Dibeem Forest-Aleppo Pines



### Dibeem Local Market



## WETLAND/ECOLOGICAL REJUVENATION



### Bahrain International Airport



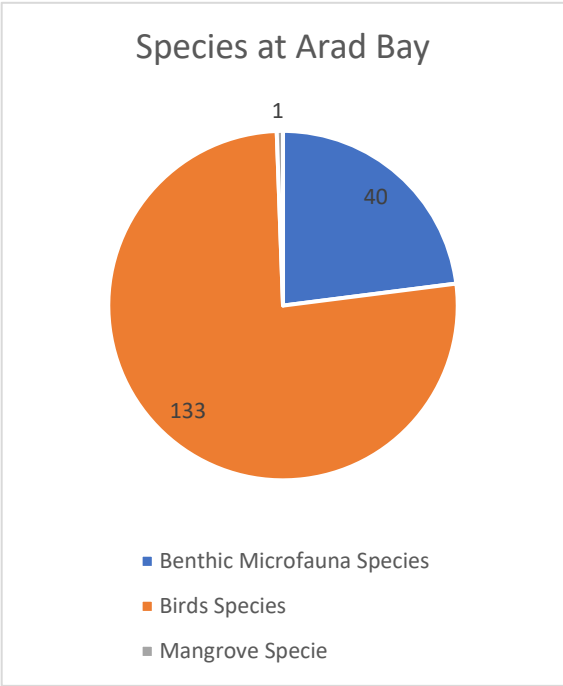

#### Biodiversity at the New Developments of Bahrain International Airport

Biodiversity is a key environmental pillar that has been considered since the design of the Bahrain International Airport (BIA) terminal and corresponding new developments, focusing on the preservation of local ecosystems, and promoting healthy conditions for organisms to thrive. The new developments of BIA are LEED Gold certified making them a pioneer for green buildings in the Kingdom of Bahrain.

The airport biodiversity action plan focuses on enriching the viable plant species around the terminal and in other areas along the airport boundary while maintaining ecological balance and preserving biodiversity. The landscaping strategy comprises the planting of 350 palm trees and 700 other adaptive plant species of native origin that require minimal irrigation. Palm trees are a native tree to the Kingdom of Bahrain and have existed for millennia, as the Kingdom was once known as the land of a million palm trees which emphasizes the historical value and unique natural heritage.

As part of Bahrain Airport Company (BAC)'s initiative to safeguard the natural ecosystems and biodiversity conservation, a pollution prevention strategy is implemented to ensure the protection of Arad Bay. Covering an area of 0.44 km<sup>2</sup> and located near the boundary of BIA, Arad Bay was declared as a protected marine reserve by law and was declared by BIA as a sensitive receptor. Thus, stormwater protection was incorporated into the pollution prevention strategy, that encompasses four oil interceptors installed along the stormwater lines in addition to the already existing two oil interceptors to ensure the protection of Arad Bay from pollutants. An extensive monitoring environmental program is also in effect to ensure the preservation of the marine ecosystem at Arad Bay as it houses 174 species of resident and migratory birds and plant species monitored by the local authorities and BIA team.

Project Graphics

Arad Bay Protected Marine Reserve at Bahrain International Airport Boundary	Arad Bay Protected Marine Reserve at Bahrain International Airport boundary								
									
Arad Bay Protected Marine Reserve at Bahrain International Airport Boundary	Walking path from the Multistorey Carpark incorporating native plants species								
<div><p>Species at Arad Bay</p><table><thead><tr><th>Species Type</th><th>Count</th></tr></thead><tbody><tr><td>Benthic Microfauna Species</td><td>40</td></tr><tr><td>Birds Species</td><td>133</td></tr><tr><td>Mangrove Specie</td><td>1</td></tr></tbody></table></div>	Species Type	Count	Benthic Microfauna Species	40	Birds Species	133	Mangrove Specie	1	
Species Type	Count								
Benthic Microfauna Species	40								
Birds Species	133								
Mangrove Specie	1								



## WETLAND/ECOLOGICAL REJUVENATION



### **Darwin International Airport Gurumbai Cultural Trail Upgrades**

The Gurumbai Cultural Trail at Darwin International Airport (DIA) represents a transformative Nature-Based Solution project, embodying the Biodiversity and Nature-Based Solutions theme in the Green Airports Recognition 2024. Gurumbai, named by the Larrakia People, encompasses the Rapid Creek Conservation Reserve, housing Darwin's sole natural freshwater creek.

In collaboration with the Larrakia Nation, the Gurumbai Cultural Experience, situated 500 meters from the airport terminal, enhances the existing 3.5km walking trail. Key improvements include 650 meters of wheelchair-accessible pathways, a new ramp, cultural signage introducing Larrakia Culture, a 25-person seating area, a presentation stage for small groups, and a new water access point with increased waste bins.

Scheduled to commence in the 2024 dry season, the Gurumbai Cultural Experience will offer Indigenous-led one-hour guided walking tours, delving into the cultural and historical significance of the area to the Larrakia People. These tours explore their profound connection to the land, freshwater, and seasonal bush tucker.

As part of DIA's commitment to environmental stewardship and biodiversity, the project includes the revegetation of Rapid Creek with 372 native saplings comprising 35 different species. This initiative focuses on rehabilitating the monsoon forest and transition communities, contributing to the overall biodiversity of the area.

Integral to the project is the involvement of trainees from the Indigenous Training Academy (ITA), established by ADG in 2022. These trainees will play a crucial role in conducting guided tours, adding an authentic Indigenous perspective to the visitor experience. This inclusion aligns with the Nature-Based Solutions framework and broader goals of sustainability and environmental progress in the aviation industry.

The Gurumbai Cultural Trail exemplifies a holistic approach to airport environmental projects, weaving together biodiversity conservation, Indigenous cultural preservation, community engagement, and active revegetation efforts. The project sets a benchmark for airports striving for excellence in sustainable practices and cultural enrichment.

Project Graphics

<p>Preserving the Past, Protecting the Future: Larrakia Rangers in Action. A vital backburning operation near the Gurumbai Cultural Trail, contributing to environmental conservation and reducing fire risks for a sustainable future.</p>	<p>Guardians of Gurumbai: Larrakia Ranger's dedication extends to the water's edge. Clearing the path to a cleaner, healthier Rapid Creek – a tangible commitment to environmental stewardship and community care</p>
	
<p>The pristine flow of Rapid Creek captured in a moment of serenity. A living testament to the importance of protecting our natural treasures for generations to come.</p>	<p>A captivating blend of progress. The top reveals the completed Gurumbai Cultural Trail, a testament to dedication and vision. Below, the intricate dance of concrete formwork shaping the pathway towards sustainable cultural experiences.</p>
	

## WETLAND/ECOLOGICAL REJUVENATION



**Hobart Airport**  
TASMANIA

### **Hobart International Airport**

#### **Cultural Burn - Preserving critically endangered grassland through indigenous land management practices**

At Hobart Airport, sustainability is embedded in everything that we do. Balancing the need for growth and development while preserving the biodiverse rich environment that Hobart Airport calls home, is critical to our long-term sustainability.

Our Cultural Burn Project explores best practice land management techniques, as used by the traditional owners of the land for hundreds of thousands of years. Aligned with the United Nations Sustainable Development Group (UNSDG) Goal 15 to protect, conserve, and manage ecosystems while simultaneously providing other social, environmental, and biodiversity benefits, the project has now completed two cultural burns with strong indicators of its success to date.

Hobart Airport is home to critically endangered silver tussock grasslands (protected nationally under the Environment Protection and Biodiversity and Conversation Act 1999 (EPBC Act). It is among the most critically endangered vegetation communities in Australia. The grasslands also provide habitat for rare and protected herb species such as the yellow beauty head, roundleaf wilsonia and leafy fireweed.

In collaboration with the Tasmanian Aboriginal Centre and the Tasmanian Aboriginal Community, Hobart Airport grasslands are being managed through traditional land burning practices. The “cool mosaic burn” technique used reduces biomass and encourages regrowth, preserving and enhancing the significant biodiversity values of the grassland over time.

This practice also forms an important part in maintaining and learning about the cultural landscape of Australia. In addition to the biodiversity benefits, the opportunity for First-nations community members to pass on their knowledge to younger generations is incredibly valuable. The project also provides an opportunity to engage with our community and airport precinct partners and raise awareness of the significant environmental values on the airport land.



Project Graphics

<p>The burn in action</p>	<p>Traditional practices in use</p>
	
<p>Working in collaboration with the local community</p>	<p>The cool, slow burn is carefully managed on airport grounds</p>
	

## WETLAND/ECOLOGICAL REJUVENATION



### **Narita International Airport**

#### **Creation of a Wetland various animals live in**

In March 2024, Narita International Airport Corporation restored a wetland environment on land we own outside the airport. Aquatic animals, such as frogs and newts, were relocated and conserved. Additionally, we also identified multiple insects, birds, and fish in the created environment.

Green Port eco Agri Park, a natural park owned and managed by Narita Airport Corporation, has several abandoned farmlands that have been neglected for many years. In such places, the land is becoming increasingly dry, which is thought to have a negative impact on the ecosystem.

We spent a month developing approximately 1,000 square meters of former farmland within the park.

The main tasks for wetland restoration include removing small trees and weeds, digging up soil, creating waterways (installing temporary waterways), and surveying. In addition, we recorded the time and labor force required for each task for future reference.

A week after the wetland was created in the park, we relocated the frog eggs. After another month, we confirmed that the tadpoles had hatched in a monitoring survey. Research revealed that many other aquatic organisms had settled there. We are currently working on plans to restore wetlands in several areas.

A future issue is that grass grows quickly around the wetland, especially in the summer, and maintenance requires a lot of effort and costs.

Currently, we are ordering grass cutting from a local company, but it is not very efficient. We are looking for better management methods. For example, we will work with local non-profit organization and related companies to maintain and manage this wetland.



Project Graphics

Created wetland.	The location of Chapter 1 before creation
	
A worker maintaining waterways.	Many tadpoles seen in the wetland
	



## WETLAND/ECOLOGICAL REJUVENATION



### **Queenstown Airport Shotover Wetland restoration**

Queenstown Airport (ZQN) is the gateway to the Southern Lakes region of New Zealand, which is famous for its natural beauty.

It is one of the most spectacular settings for an airport anywhere in the world, and inbound passengers are awestruck when they fly in through soaring mountains and glimpse Lake Whakatipu for the first time.

Queenstown Airport is, therefore, deeply conscious of the need to protect what makes this special place unique, and investing in biodiversity is a key element of its Sustainability Strategy.

The airport has a longstanding relationship with the Whakatipu Reforestation Trust, which aims to restore the native biodiversity of the region through revegetation projects, collaboration, education, and advocacy.

In 2022, it expanded this partnership to support a community project of special significance to the airport – the restoration of the Shotover Wetland.

On approach to ZQN, aircraft fly over the regionally significant wetland, which covers nearly 7 hectares and is remarkable for the diversity of its native plants. More than 20 species have been recorded there – among them, *Olearia lineata*, a threatened species representative of the area's unique ecological and physical characteristics.

The wetland also provides a habitat for a range of birds, including pūkeko, shelducks, and swamp harriers.

The dual objectives of the project are the replanting and ecological enhancement of the wetland, and the provision of education opportunities for Shotover Primary School students, community members, and visitors.

Queenstown Airport's involvement has accelerated the project, with a target to fully restore the wetland within 10 years. It includes financial assistance, in-kind support, and paid volunteering sessions for each member of the airport company's team.

Queenstown Airport has also launched a predator trapping programme to ensure that airport land near the wetland is predator-free. The traps are set and monitored by the Airport Emergency Services team.

Project Graphics

<p>Queenstown Airport Chief Executive Glen Sowry discusses the restoration of the Shotover Wetland with two Shotover Primary School pupils.</p>	<p>An Air New Zealand aircraft flies over the Shotover Wetland inbound for Queenstown Airport.</p>
 A photograph showing an older man in a dark jacket and blue cap (Glen Sowry) standing outdoors with two young boys in blue and yellow school uniforms. They are all looking at a large map or plan spread out on a clipboard. In the background, there are mountains and some construction materials.	 A photograph of a grassy field with a large green tree in the foreground. In the distance, a small aircraft is visible flying over a mountain range under a blue sky with some clouds.
<p>The Shotover Wetland has been deemed regionally significant as a habitat for wildlife and threatened native plants.</p>	
 A photograph of a wetland area with tall, dry grasses and some green plants. In the background, there are mountains and a line of trees.	 A photograph of a wetland area with various plants, including a large yucca-like plant in the foreground. In the background, there are mountains and a clear sky.

## WETLAND/ECOLOGICAL REJUVENATION



### Sydney Airport

#### Bringing Country back to Wetlands

In 2023, SYD engaged Wildflower, Gardens for Good Inc. (Wildflower) to undertake bush regeneration works at the Airport Wetlands. Wildflower is an Indigenous-led not for profit social enterprise who specialise in premium sustainable horticulture, landscape and ecology services to businesses and government clients, including ecological restoration projects.

Wildflower completed over 1,400 hours of work, resulting in ecological improvement in an area of over 12,500 m<sup>2</sup>. The works included noxious weed removal, planting of native species, and collecting native seeds for propagation. Wildflower provide safe, meaningful employment to First Nations people, many of whom facing significant and complex barriers to employment.

The project raised awareness by providing staff with opportunities to participate in tree planting days. SYD contributed to Wildflower's mission by providing their staff with a tour of the airport and presentations on other meaningful employment opportunities at SYD. The information sharing has boosted community engagement by providing staff with a connection to the environment and further broadening the employment prospects of at-risk young people.

In May 2023, the project won a \$50k community grant through IFM Investors, which demonstrated top-down support for the project from SYD's owner group. The grant went directly to Wildflower to further fund bush regeneration works at the wetlands.

The bush regeneration works are vitally important to biodiversity in the area. The wetlands are home to some threatened species of birds and reptiles, by removing weeds and planting natives, these threatened species have the opportunity to thrive. By beautifying the area, this has opened up an opportunity to work with the local council to construct a footpath and bike path, which would provide a huge benefit to the local community.



## Project Graphics

<p>The project won the Heritage, Culture and Community Spirit Award at the 2023 KAB NSW Sustainable Cities Awards</p>	<p>Before bush regeneration works</p>
	
<p>Same area as Photo 2 - After planting native species</p>	<p>The native species continue to grow and flourish</p>
	

## MARINE LIFE CONSERVATION BY AIRPORTS



### **Chubu Centrair International Airport**

#### **Forests grow marine life**

Chubu Centrair International Airport (NGO) had "Afforestation" twice in 2022 and 2023, for the purpose of making the sea with abundant marine life.

This initiative was a collaboration not only with foresters and the local government where the forest is located, but also with the fishermen.

Forests produce a variety of organic matters and nutrients.

Rivers carry them to the sea.

The nutrients supplied to the sea feed plankton and marine organism.

In other words, forests greatly contribute to the formation of rich marine ecosystems and fisheries resources.

NGO is located on an artificial island surrounded by the ocean.

It is our important mission to not only keep but also enrich the marine ecosystem.

"Afforestation" is one of the activities aimed at achieving this goal.

The first tree planting took place in May 2022 in Kiso Town, approximately 180 kilometers away from the NGO and at the altitude of 1,600 meters.

50 zelkova saplings were planted by the local government, foresters, fishermen, and NGO staff with our CEO.

The second planting took place in June 2023 in Ohno Town, about 80 kilometers from NGO.

With the participation of local elementary school students, the number of participants increased to 150. Sawtooth and quercus oak saplings were planted.

This effort does not have numbers as results, however, has formed a relationship with fishermen, local town, foresters and our airport actually.

In addition, we believe that this activity will appeal the importance of the sea with abundant marine life and biodiversity.



Project Graphics

Afforestation by elementary school students	Foresters, Local Government, Fishermen, and NGO staff
	
Forests grow marine life	Location of Afforestation
	



## MARINE LIFE CONSERVATION BY AIRPORTS



### **Hongkong International Airport**

### **Implementation of Marine Ecology and Fisheries Enhancement Measures at Hong Kong International Airport**

Hong Kong International Airport (HKIA) is located on the northern coast of Lantau Island. Nearby marine and terrestrial environments are rich in biodiversity and Airport Authority Hong Kong (AA) has long recognised a duty of care to avoid and minimise adverse impacts on biodiversity assets from airport development and operation.

A comprehensive assessment of the impacts on nature from expansion of HKIA into a Three-Runway System (3RS) was critical in gaining statutory approvals. Additionally, AA has developed a Marine Ecology and Fisheries Enhancement Strategy (MEFES) going well beyond statutory requirements comprising voluntary nature-positive solutions collectively intended to enhance biodiversity and fisheries resources. AA researched potential enhancements and has completed pilot tests to explore real-world value and viability of scaling-up promising initiatives:

#### **A) Eco-enhancement of HKIA's seawalls**

Eco-enhanced blocks have been placed along sloping and vertical seawalls incorporating a range of grooves and pits intended to increase microhabitat complexity and provide habitats for intertidal organisms.

#### **B) Artificial Reef (AR) deployment**

ARs have been deployed in waters to the west of HKIA's South Runway to investigate ecology and fisheries value – significantly higher abundance and coverage of mobile and colonisation species are identified one year after deployment; up to 1000 further ARs are now in planning.

#### **C) Shellfish Reef (SR) deployment**

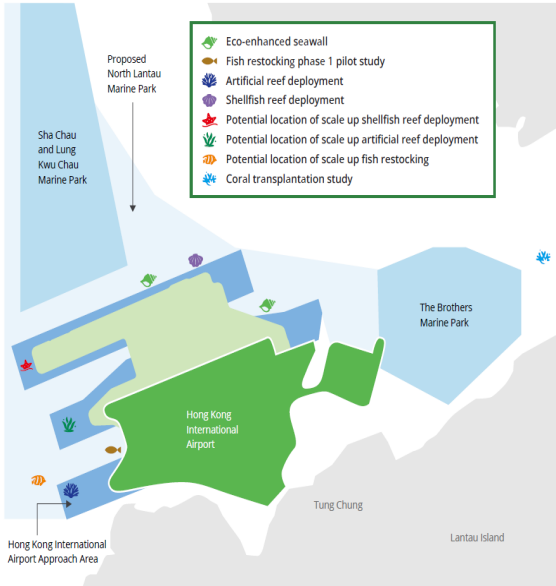

In partnership with NGOs and academic institutes, the value of deploying SRs comprising limestone, recycled shells and live oysters along parts of the airport seawall's subtidal zone has been investigated with monitoring identifying positive benefits; SR scale-up is underway.

#### **D) Fish fry release**

AA has piloted releases of commercially important fish species to the west of HKIA / in vicinity of deployed ARs to assess restocking potential for enhancing fisheries resources.

AA is committed to working to ensure that the enhancement initiatives bring tangible biodiversity and fisheries value to our marine environment.

Project Graphics

<p>Location of voluntary marine enhancement measures around HKIA</p>	<p>Prefabricated artificial reefs units being delivered to the west of South Runway for deployment</p>
	
<p>Shellfish reef monitoring and identification of recruited species</p>	<p>Fish fingerlings being released into the waters within vicinity of the AR units</p>
	

## MARINE LIFE CONSERVATION BY AIRPORTS



### Kansai International Airport

#### Creating a rich seaweed bed and blue carbon

Kansai International Airport (KIX) was built on the sea, 5 km away from land, to create an airport free of noise pollution. Despite concerns that the construction would have a negative impact on the marine environment, our initiatives to harmonize with the marine environment have resulted in the creation of a new ecosystem surrounding a seaweed colony in a sea bed previously sand and silt.

This project started with the aim to providing a positive effect on the local community with the seaweed bed at KIX that serves not only as a biological habitat but also as a carbon sink. It was essential that the next generation of seedlings take root to create a stable seaweed bed environment in the midst of external environmental changes.

That is why we analysed the results of monitoring surveys accumulated to date and transplanted mother algae to areas of the airport island where seaweed was scarce, promoting the establishment of the seedlings. In the four years from 2019 to 2022, we transplanted approximately 35,000 large seaweeds.

As a result, a vast and rich seaweed bed is currently being formed on the seawall around the airport island (a seaweed bed area of 54 ha).

Through this project, the seaweed bed at KIX has achieved the following.

- Obtained credit certification in 2022 for 103.2 tons of carbon sequestration over the five years from FY2017 to FY2021.
- Recognized as one of the sites contributing to achieving the global biodiversity target "30 by 30" in 2023 and to be registered in the international database as an OECM soon.
- Provided the local communities with seaweed (150 plants) grown on the airport island seawall in 2023.

The seaweed bed at KIX embodies our quest to coexist with human activities (construction of man-made structures) and nature.



Project Graphics

Kansai International Airport Island	Seaweed bed around the airport island
	
Seaweed transplantation	Cooperation with local communities (providing environmental learning opportunities for kindergarten kids).
	

## MARINE LIFE CONSERVATION BY AIRPORTS



### **Mactan-Cebu International Airport Coastal Clean-up**

Mactan-Cebu International Airport (MCIA) is committed to environmental sustainability through regular Coastal Clean-Up project.

The project of the MCIA in the surrounding and nearby coastal areas of MCIA is consistent with its unwavering commitment to environmental stewardship, championing support for the diverse avian biodiversity of Olango Wildlife sanctuary, the first Philippine wetland of international importance, and recognizing its important role in conserving the existence and transformation of various ecosystems - habitats like forests, marshes and grasslands that store carbon, keep the climate stable, oxygenate the air and transform pollutants into nutrients.





The project encompasses a range of activities, including:

- Removal of marine debris and restoration of coastal reef;
- Awareness and education and close community involvement;
- Engaging stakeholders to ensure continuous conduct of survey and inventory of various avian population, foraging or roosting the area;
- Engage partners in enforcement of environmental rules and regulations
- Consultation with authorities on its implications to eco-tourism and livelihood.
- Identifying and protecting endangered species and enforcement of rules and regulations conserving the area;
- Protect the livelihood of the affected coastal communities;

The cleanup also allows various mangrove species, sea-grass, algae echinoderms, crustacean, corals and other coastal and marine life to flourish, which directly benefits the avian biodiversity.

The project engages participation of the affected local communities, considering MCIA's genuine concern to their livelihood, including sustainable fishing and eco-tourism whose socio-economic benefit placed consideration that the aforementioned positive effects could prevent storm surges, debris-flowback, reduce aquatic coliform protecting, conserving, restoring safer seafood, seawater environment. Education and awareness bids to inculcate increased appreciation among the coastal communities on how to sustain a safer, healthier, aesthetically appealing coastal and marine environment. The project likewise ensures regulatory authorities enforcement against wildlife-trafficking.

Project Graphics

<p>A wide variety of migratory bird in Olango Islands including the chinese egret also forage the coastal areas.</p>	<p>Thousands of migratory birds play a vital role in Worlds’ ecosystem, contributing to nutrient cycling, seed dispersal, and pest control and determines and overall.</p>
<div><p>*photo taken by various sources</p></div>	<div></div>
<p>Tidal flats where the MCIA approach lights is located and Olango Bird sanctuary are also used as foraging areas of the migratory birds.</p>	<p>Clean-up project includes not only staff, but management participation together with affected communities and volunteers.</p>
<div></div>	<div></div>



## BASKET OF MEASURES FOR BIODIVERSITY



### **Kaohsiung International Airport Airport Biodiversity Conservation Initiatives Action Plan**

In 2018, Kaohsiung International Airport (KHH) approved the New Terminal Plan and the 2035 Master Plan, hence conducted an environmental impact assessment. An ecological survey found that there are more than 55 species of animals and 201 species of plants onsite, including protected species and plants. Therefore, we initiate the project of Airport Biodiversity Conservation Initiatives Action Plan in 2019. The Biodiversity and Anti-Deforestation Commitment is signed by the KHH Director. Under the premise of ensuring flight safety, KHH adopted the Avoidance, Mitigation, and Restoration strategy to implement biodiversity actions, promote inclusion in ecological initiatives extensively at the Airport.

Kaohsiung International Airport has cooperated with the Wild Bird Association to develop conservation measures for rare and valuable birds, and actively promote the ecological management model to avoid inhumane bird removal. From 2019 to 2023, the number of bird species on the site has increased from 23 to 38, the total number of birds increased from 89 to 631, and 10 rare species of rare and conserved birds were recorded. Meanwhile, the average number of bird strikes has not increased.

The Airport adopts ecological construction methods to avoid harming the ecosystem, mitigate the impact of construction on the environment, and restoring wildlife. After the completion of the drainage ditch project, 12 species of fish including *Monopterus albus* and tilapia were found through water ecological surveys, successfully restoring life to the waters within the site.

The Airport commits to anti-deforestation, meanwhile the terminal building follows the principles of biodiversity index and green building index when designing. The total number of trees on landside at KHH reaches 828. Through healthy planting management and the addition of green space, 854 butterflies, 11 species are present onsite. Airport Biodiversity Conservation Initiatives Action Plan minimizes external social costs and maximizes social benefits to achieve a future in harmony with nature.

Project Graphics

<p>Kaohsiung International Airport Biodiversity Conservation Initiatives Action Plan</p>	<p>Flight Safety and Bird Protection</p>
<div><h3>Airport Biodiversity Conservation Initiatives</h3><div><div><ul style="list-style-type: none"><li>• Kaohsiung International Airport initiate the project of Airport Biodiversity Conservation Initiatives Action Plan in 2019. The KHH adopt the Avoidance, Mitigation, Restoration strategy to implement biodiversity actions, promote inclusion in ecological extensively at the Airport.</li></ul></div><div><div><p><b>Kaohsiung International Airport Biodiversity and Anti-Deforestation Commitment</b></p><p>Kaohsiung International Airport (KHH) recognizes that nature is an important asset and that maintaining and enhancing biodiversity is essential for sustainable development. As part of the Airport's commitment to the environment, KHH has adopted the Biodiversity and Anti-Deforestation Commitment. This commitment is a key part of the Airport's overall environmental management system and is integrated into all of its operations and development activities.</p><p>In support of the United Nations Convention on Biological Diversity (CBD) and Sustainable Development Goal (SDG) 15 (Life on Land), Kaohsiung International Airport is committed to high biodiversity conservation and to the implementation of measures to avoid, mitigate and restore biodiversity and to the implementation of measures to protect and enhance biodiversity. The Airport is committed to the following actions:</p><ol style="list-style-type: none"><li>1. To avoid, minimize, mitigate, restore and offset any negative impacts on biodiversity from Airport operations and development.</li><li>2. To implement measures to avoid, minimize, mitigate, restore and offset any negative impacts on biodiversity from Airport operations and development.</li><li>3. To implement measures to avoid, minimize, mitigate, restore and offset any negative impacts on biodiversity from Airport operations and development.</li><li>4. To implement measures to avoid, minimize, mitigate, restore and offset any negative impacts on biodiversity from Airport operations and development.</li><li>5. To implement measures to avoid, minimize, mitigate, restore and offset any negative impacts on biodiversity from Airport operations and development.</li><li>6. To implement measures to avoid, minimize, mitigate, restore and offset any negative impacts on biodiversity from Airport operations and development.</li><li>7. To implement measures to avoid, minimize, mitigate, restore and offset any negative impacts on biodiversity from Airport operations and development.</li><li>8. To implement measures to avoid, minimize, mitigate, restore and offset any negative impacts on biodiversity from Airport operations and development.</li><li>9. To implement measures to avoid, minimize, mitigate, restore and offset any negative impacts on biodiversity from Airport operations and development.</li><li>10. To implement measures to avoid, minimize, mitigate, restore and offset any negative impacts on biodiversity from Airport operations and development.</li></ol><p>Executive Signature: <i>Jia-Yuan Chen</i></p><p><b>Biodiversity and Anti-Deforestation Commitment</b></p></div><div><div><p><b>Flight Safety and Bird Protection</b></p><p>Cooperated with wild bird association to conduct bird survey monthly. Develop conservation measures for rare and valuable bird, promote ecological management model and avoid inhumane bird removal.</p></div><div><p><b>Ecological Construction Methods</b></p><p><b>Avoid</b> harming the ecosystem, <b>mitigate</b> the impact of construction on the environment, and <b>restoring</b> wildlife.</p></div><div><p><b>Green Space and Anti-Deforestation</b></p><p>Commits to anti-deforestation, follows the principles of biodiversity index and green building index. Implement healthy planting management and addition of green space.</p></div><div><p><b>Environment Education</b></p><p>Regularly organizes ecological conservation courses to airport staff, tenants, and local communities</p></div></div></div></div></div>	<div><h3>Flight Safety and Bird Protection</h3><div><p>Intermediate egret at the Airport's north ecological green space</p></div><div><p>Intermediate egret at the Airport's north ecological green space</p></div><div><p>Total number of birds species onsite has increased from 23 to 38, total number increased from 89 to 631 in five years, an increase of more than six times</p></div><div><p>Second-level conservation Greater painted-snipe</p></div></div>
<p>Ecological Construction Methods</p>	<p>Green Space and Anti-Deforestation, Environment Education</p>
<div><h3>Ecological Construction Methods</h3><div><div><p><b>Before</b></p></div><div><p><b>After</b></p></div></div><div><p>Adopts ecological construction methods</p><p>After the completion of drainage ditch transforming project, 12 species of fish including <i>Monopterus albus</i> and tilapia were found</p><p>Successfully restoring life to the waters within the site</p></div></div>	<div><h3>Green Space and Anti-Deforestation, Environment Education</h3><div><div><p><b>Before</b></p></div><div><p><b>After</b></p></div></div><div><p>Nearby land was acquired and transformed into ecological green space, increasing overall green area.</p></div><div><div><p>A total of 828 trees, including 11 old trees that are 60 years+ old, such as <i>Samanea saman</i>.</p><p>Conservation Black-naped oriole like to inhabit the canopy of trees, all trees are pruned naturally, which has attracted the oriole to perch on many occasions.</p></div><div><p>Through healthy planting management and addition of green space, 854 butterflies, 11 species are present onsite</p></div><div><p>Regularly organizes ecological conservation courses to airport partners, staffs, local communities</p></div></div></div>

## BASKET OF MEASURES FOR BIODIVERSITY



### **Taoyuan International Airport Biodiversity and Nature-Based Solutions**

In response to the United Nations' "Convention on Biological Diversity" and the 14th and 15th "Sustainable Development Goals", Taiwan Taoyuan International Airport Corporation Ltd. (TTIA) called on 85 predominantly airport partners to jointly announce the adoption of a carbon reduction and energy/environment/water management campaign, with a commitment to expanding biodiversity and nature-based solutions:

1. Senior personnel continue to commit to biodiversity, ecological conservation, and sustainable operation strategies for green transportation that are integrated with nature;
2. New construction and expansion projects have introduced rolling ecological surveys and environmental monitoring, including air quality, noise, wastewater, etc. The new construction of Terminal 3 is currently a national demonstration site for construction environmental monitoring;
3. Display any meaningful achievements on entry and exit routes to promote and highlight biodiversity and nature-based solutions to tourists and employees;
4. Publish the monthly "Green News" e-newsletter to promote domestic and international trends, including biodiversity and nature-based solutions, to airport staff;
5. Encourage airline operators to sign the "Buckingham Palace Declaration" and commit to banning the trade of endangered wildlife and protected animals, including food.
6. Cooperate with airport partners to release the "Forest and Biodiversity Conservation Commitment" and "Supplier Code of Conduct" to promote supply chains to jointly protect global biodiversity and forest conservation.
7. Call on airport partners (more than 50,000 employees) to conduct regular training on carbon reduction, energy and resource management, ecological education, etc., to integrate environmental sustainability into daily life, and to increase employees and customers' awareness of conservation and eco-friendly actions;

Over the years, various actions have received widespread responses and results, and have built a solid trajectory and natural assets for future "biodiversity and nature-based solutions".



Project Graphics

<p>2023-2026 Joint cooperation in carbon reduction and ESG announcement conference of TTIA and airport stakeholders.</p>	<p>Biodiversity promotion in departure lounges: endangered species, animal and plant conservation, adoption, and research achievements.</p>
	
<p>The TTIA and airport stakeholders conduct frequent tree planting, wetland conservation, beach, and mountain trails cleanups activities.</p>	<p>Taoyuan International Airport's Management Framework of Biodiversity Risk and Nature-based Solutions.</p>
	

## WILDLIFE MANAGEMENT FOR SAFE OPERATIONS



### **Sardar Vallabhbhai Patel International Airport Nature based Solution to Wild Life Hazard Management**

Free Bird movement and airport operations are challenging tasks, owing to passenger safety, delays in flight operations, and bird injury. Conventional methods like gas canons and bird scarring guns have been used to control bird movement, but these generate noise and air pollution issues. Additionally, pesticides used for soil treatment can affect soil properties and the food chain, leading to bird and ecosystem bioaccumulation.

To address these issues, various nature-based solutions have been implemented at SVPI airport, reducing bird strikes (from 292 to 126) by 166 in the last three years and reduced gas canon usage from 30 Nos to 3 Nos in current FY.

The nature-based solutions include implementation:

- Biodiversity Conservation Plan
- Clearly defined objectives
- Internal and external stakeholder partnership
- Planting stylosanthes hamata grass which has self-limiting height
- Storm water management to control water accumulation
- Covering the drains with nylon mesh [to not to allow larva growth and avoiding resting place inside the drain]
- Use of only herbicides for insect control [strictly avoiding pesticides that can bioaccumulate in the food chain]
- Installing Farrow's light traps to capture insects and anti-perch devices at identified resting places for birds

An Airport Environment Management Committee has been formed along with internal, external stakeholders and regulators to review the progress of the long-term environmental conservation plan.

Joint initiatives outside the airport premises, such as carcass dump cleaning, door-to-door garbage collection, awareness programs to stop bird feeding and racing, tree trimming, and custom-made anti-bird perch devices nearby buildings, have been taken up with the help of regulators.

As a corporate, we are committed to achieve No Net loss to Biodiversity by 2030 by reducing bird movement and ensuring a safer environment for passengers as well as birds.



## Project Graphics

<p>Nature-based solutions - Grass height maintenance to restrict insect growth.</p>	<p>Nature-based solutions - Farrow's light trap installed to trap insects.</p>
	
<p>Nature based solutions - Airside storm drainage management to restrict water accumulation and drain covers with nylon mesh which restrict bird movement inside drain.</p>	<p>Soil treatment with Entomopathogenic nematodes as biological control agents of economically important insect pests i.e. nature-based solutions</p>
	





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ACI Asia-Pacific & Middle East (ACI APAC & MID) serves as the voice of 133 airport members, operating 624 airports across 47 countries/territories in Asia-Pacific and Middle East. ACI Asia-Pacific & Middle East is head-quartered in Hong Kong and has a Middle East office in Riyadh (Kingdom of Saudi Arabia).

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