

LoLo's Flying Journey

Education Game Pack

User Manual

About WWF

World Wide Fund for Nature (WWF)

WWF is one of the world's most respected conservation organisations, with a network active in more than 100 countries. WWF's mission is to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption

Established in 1981, WWF-Hong Kong has been working in support of our global mission, with a vision to transform Hong Kong into Asia's most sustainable city where nature is conserved, carbon pollution is reduced, and consumption is environmentally responsible.



The education game pack "LoLo's Flying Journey" is designed for kids to learn about waterbird migration using Black-faced Spoonbill as an example, the relationship between human and it and inspire them to think about their conservation. This interactive game pack was developed in 2005, now it was revamped in 2022 to update the information provided and optimize the pack for increased efficiency.

Contact:

WWF Hong Kong
15/F, Manhattan Centre,
8 Kwai Cheong Road,
Kwai Chung, New Territories
Hong Kong

E-mail: wwf@wwf.org.hk
Tel.: +852 2526 1011
Fax.: +852 2845 2764
Website: www.wwf.org.hk

About EAAFP

The East Asian - Australasian Flyway Partnership (EAAFP)

Adopted in the list of the World Summit on Sustainable Development in 2002 as a Type II initiative which is informal and voluntary, **The East Asian - Australasian Flyway Partnership (EAAFP)** was launched on 6 November 2006. EAAFP is also recognized as one of the Ramsar Initiative in 2005. The Partnership aims to protect migratory waterbirds, their habitats, and the livelihoods of people dependent upon them in the **East Asian - Australasian Flyway**.



There are currently 39 Partners including 18 countries, 6 Intergovernmental agencies, 13 International Non-governmental Organizations (iNGOs), 1 International Organization, and 1 International Private Enterprise. The EAAFP developed the Flyway Site Network of wetlands of international importance for the conservation of migratory waterbirds. At present, there are over 150 Flyway Network Sites and the network is actively expanding. There are 7 Working Groups and 9 Task Forces to facilitate conservation work in the **East Asian - Australasian Flyway**.

Contact:

EAAFP Secretariat
3F Bon-dong G-Tower,
175 Art Centre-daero,
Yeonsu-gu, Incheon 22004
Republic of Korea

E-mail: secretariat@eaaflyway.net
Tel.: +82 32 458 6501
Fax.: +82 32 458 6508
Website: www.eaaflyway.net

Acknowledgement

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This game is based on an original idea by Barrie Cooper, former International Education Manager, the Royal Society for the Protection of Birds.
(The RSPB is the UK representative of BirdLife International.)

Illustration: Rohan Chakravarty

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A. The Story Begins...

Hello! My name is LoLo. I am a Black-faced Spoonbill, easily recognized by my rather large black beak that looks like a spoon. Don't you think I look fabulous? But the sad news is, there are not many Black-faced Spoonbills left in the world, which makes me what humans call an "endangered species". Like most of my friends and relatives, I was born in Korea. When cold winter arrives, I fly southwards along with many other migratory waterbirds to warmer places such as Kyushu, Fujian, Tainan, and Mai Po where food is abundant and life is easier (Fig. 1). Then, every springtime, we return to our beloved homeland for breeding. However, the migratory journey is never easy for us. It is long and full of challenges (Fig. 2). In this game, everyone will become my buddy (a fellow Black-faced Spoonbill) and experience the whole journey with me.

For more information about me:

<https://www.eaaflyway.net/black-faced-spoonbill/>

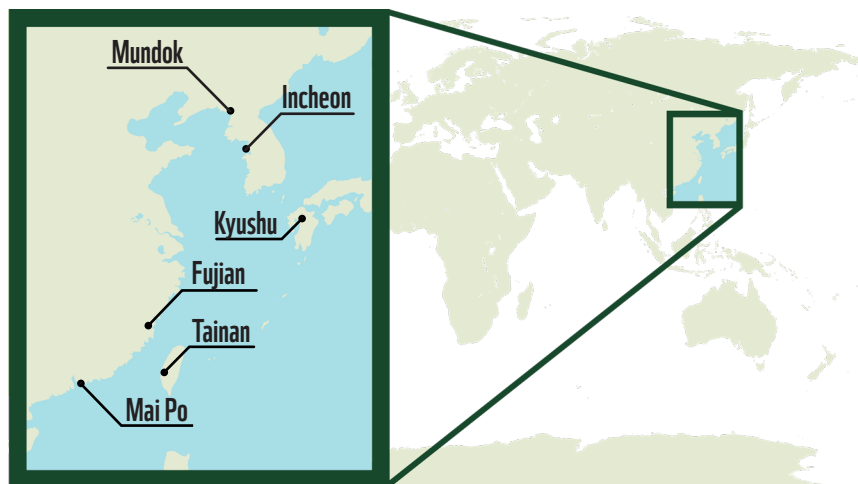


Fig. 1 Every year Black-faced Spoonbills migrate southwards to different places.



Fig. 2 The migratory journey is full of challenges.

B. Game Planning


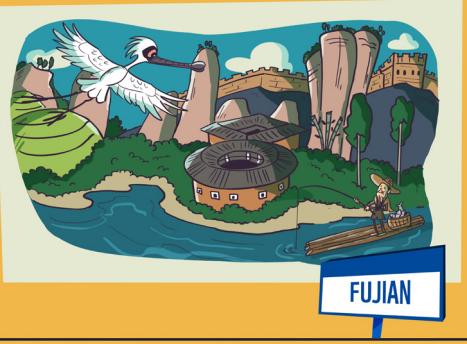


- i. **Main target audience:** age 6-15
- ii. **Duration:** 60 to 90 minutes (depending on the venue and route)
- iii. **Venue:** Campus, Country Park or Urban Park, Wetland Reserve, Visitor Centre
(using the game virtually is also an option)
- iv. **Materials:**
 1. Energy Points (Fig. 3 / P. 73)
(can be substituted with other options like candies, stickers, etc.)
 2. Checkpoint Cards (P. 74 - 79)
 3. “LoLo’s Flying Journey” Game Board (P. 13 - 72)
- v. **Preparation:**
 1. Materials set up
 - Print the Energy Points (Fig. 3) and the Checkpoint cards.



Fig. 3 Energy Point: the score card used in the game.

2. Venue set up
 - Set up a route with 6 checkpoints around the venue chosen. Put up the Checkpoint cards at each location. The checkpoint sequence should be:

Checkpoint	Location	Checkpoint cards
1	Incheon	
2	Mundok	

Checkpoint	Location	Checkpoint cards
3	Kyushu	
4	Fujian	
5	Tainan	
6	Mai Po	

vi. **How to Play:**

	Game instructions	Corresponding meaning for Black-faced Spoonbill migration
1.	Evenly divide the participants into several small groups (e.g. 4 to 6 participants in each group)	Participants in-role to become Black-faced Spoonbills, which usually migrate in groups
2.	Give 10 Energy Points to each group.	The “energy” status of Black-faced Spoonbills at the beginning of the migration

	Game instructions	Corresponding meaning for Black-faced Spoonbill migration
3.	Brief the participants on how to play the game.	/
4.	Lead the participants to the first checkpoint (Incheon)	The starting point of Black-faced Spoonbills' migratory journey
5.	Ask each group to select one out of the four scenario cards. Each card is represented by a number, i.e. number 1 to 4. Multiple groups choosing the same card is allowed.	Different things that Black-faced Spoonbills may face during their migration
6.	Discuss each of the scenario cards with the students. <u>N.B.: Teachers will find supplementary information on the back of each scenario card for interpretation and debriefing (Fig. 4. Information includes facts and background information of the scenario, and the positive and negative impacts of the scenario on the 3 pillars of sustainable development, i.e. environment, economy and society.</u>	/
7.	Add or deduct energy points for each group based on the instructions from the chosen scenario card. If a card shows a chance scenario, the group needs to answer the question to earn energy points. A wrong answer would deduct their energy points*.	Energy points show whether the Black-faced Spoonbills have migrated successfully. Positive scenarios are beneficial while the negative ones may affect their survival.
8.	Lead the participants to the remaining checkpoints and go through steps 4 to 7 at each checkpoint.	Black-faced Spoonbills visit different stopover points and wintering sites during their migration journey.
9.	Once the last checkpoint (Mai Po) is completed, calculate the energy points that each group owns. The group with the most points is the winner.	Groups that have completed the migration with remaining energy points represent Black-faced Spoonbills that have sufficient energy for migration. And groups that have zero points represent Black-faced Spoonbills that failed to complete their migration journey or even lost their life midway.
10.	Debrief the participants by highlighting key messages in conservation and education for Sustainable Development. (Please refer to Part C. for suggested debriefing topics.)	/

Incheon Card 1 Interpretation			
Facts about the scenario: <ul style="list-style-type: none"> Republic of Korea is one of the biggest breeding ground for Black-faced Spoonbills in the world. One known breeding site is on some small islands off the west coast of the Republic of Korea. 			
	Impacts on Environment	Impacts on Economy	Impacts on Society
The biggest breeding site is in the Demilitarized Zone (DMZ), the border between North and South Korea where access is restricted by law. The site is free of human disturbance.	+		
Black-faced Spoonbills are found nesting on a small man-made island in Namdong Reservoir since 2009. By 2016, nearly 300 Black-faced Spoonbills have been breeding in the area. It is now one of the most important breeding sites of Black-faced Spoonbills in the world.	+		
The small man-made island is located in the urban area, which helps raise public awareness of waterbird conservation.	+		+

Fig. 4 Supplementary information can be found at the back of each scenario card.

*Notes on energy points and interpretation card:

- Energy points are the game score. They add the “competition” element to the game and only the energy points printed on the front of each scenario card are counted as part of the game. The “+” and “-” symbols in the supplementary information indicate positive or negative impact in different perspectives (environment, social and economy), and do not affect the game’s energy point count.
- However for each scenario, there is an interpretation card providing supplementary information of the scenario and showing a wider picture – the impacts of the scenario on the three pillars of sustainable development (environment, economy and society). Teachers would make use of the information provided to debrief the students on the meaning of the game and the scenarios.

C. Suggested debriefing

(Still in-role as Black-faced Spoonbills) Hooray! We’ve finally made it to our destination in Mai Po, where we can enjoy the rich food supply and comfortable weather. Now you’ve experienced the journey as a Black-faced Spoonbill, you can appreciate the many challenges we face during our migration to the south.

Some of the difficulties we encountered during the journey were brought by Mother nature. Can you recall these natural factors?

- Weather (in Kyushu) (Fig. 5)
- Disease (in Mundok) (Fig. 6)



Fig. 5 Extreme weather affects migration.



Fig. 6 Disease causes the death of Black-faced Spoonbill.

However, it is also clear that human activity has a major impact on our survival. Human activities, whether for social or economic reasons, sometimes bring us big trouble. **Can you think of some examples of this?**

- Reclamation work in Incheon (Fig. 7)
- Transport development in Kyushu (Fig. 8)
- Fishing activity in Fujian (Fig. 9)
- Green energy development in Tainan (Fig. 10)



Fig. 7 Coastal reclamation destroys important habitats for waterbirds and marine life.



Fig. 8 Transport development destroys wildlife habitats.



Fig. 9 Fishing activity disturbs mudflat wildlife.

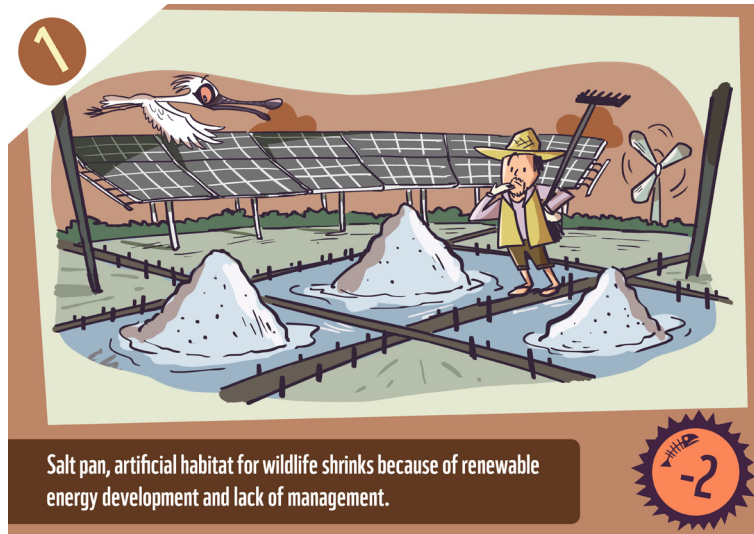


Fig. 10 The construction of green energy facilities deteriorate quality of wetland and impose danger to migratory birds.

It would not be fair to blame humans for everything. It is true that humans add extra stress to our journey, but there are some others who care about us, work hard to make our lives better and bring us back from the brink of extinction. For example, some environmental scientists have been monitoring our numbers at the different sites in our migration, and some have successfully discovered our migration route (i.e. “flyways”) (Fig. 11). This information is important for the conservation of Black-faced Spoonbills and other waterbirds.

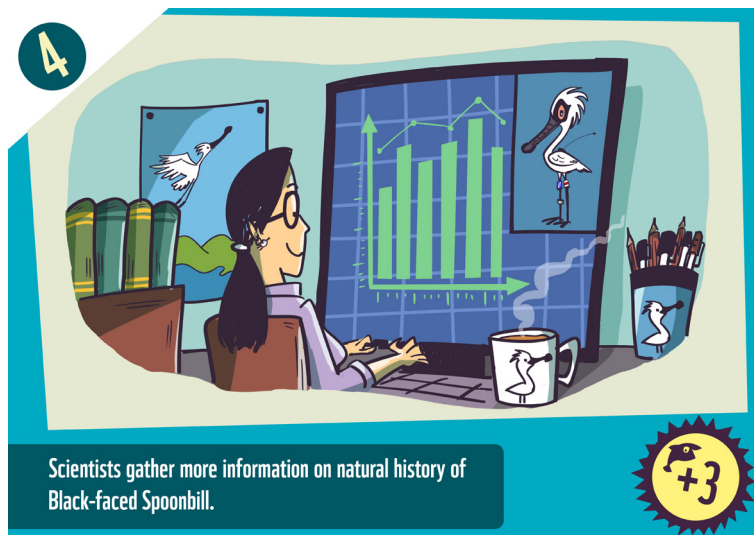


Fig. 11 Scientists gather more information on the migration of Black-faced Spoonbill by using satellite tracking.

Other humans develop eco-friendly tourism and help raise awareness (Fig. 12). With their effort, many important habitats are conserved, managed or protected for our use. Many wetlands along our flyway are now Ramsar Sites and Flyway Network Sites. They are internationally protected so that we and other waterbirds are guaranteed good stopovers during our long journey to Hong Kong.



Fig. 12 Responsible ecotourism allows people to enjoy nature without disturbing wildlife.

Although many times during the journey we encountered conflicts between human and nature, in some other scenarios humans try to create a win-win situation, where human activities and development are carried out in a way that a balance is struck between environment, economy and society. The needs of the present can be met without compromising the ability of future generations to meet their own needs (i.e. the concept of Sustainable Development). The conservation of gei wai is a good real-life example. It guarantees waterbirds a place to roost (feed) and rest, humans to harvest shrimps sustainably every year, while providing effective drainage and flood protection to humans that live nearby, as well as becoming an educational model for traditional fisheries and sustainable development. (Fig. 13)



Fig. 13 Gei wai is an example demonstrating sustainable development.

The negative scenarios might have completely different impacts when we think and act wisely e.g.

- Transport development in Kyushu – transportation railway go underground like Lok Ma Chau Spurline?

- Fishing activity in Fujian – fish zone or season restriction/gei wei traditional practice as shown in the Mai Po session.
- Green energy development in Tainan – Mitigation measures, choice of location, facility design to minimize collision, etc.

Can you think of other ways to twist the fates?

Children hold the key to our (and their own) future. What sorts of things can children do to help reduce the impact humans have in nature and bring us towards a sustainable future? (Fig. 14)



Fig. 14 What can students do to conserve Black-faced Spoonbills and the environment?

1. Reduce Unnecessary Waste

1	Stop and think whether the item is necessary before purchasing.
2	Reduce unnecessary single-use products, choose reusable ones.
3	Bring your own shopping bags.
4	Bring your own bottle, don't buy bottled drinks.
5	Bring your own container and utensils for takeaway food.
6	Choose products with minimal packaging, reduce unnecessary plastic packaging.

2. Treasure Water Resources

1	Don't rinse your hands, clothes or vegetables under a running tap.
2	Take short showers instead of baths.
3	Only run washing machines or dishwashers with a full load.
4	Defrost frozen food by moving it from freezer to the fridge the day before, instead of putting it under running water.
5	Check your water bill regularly and reflect on your water use habits. Try to set a target to reduce water consumption.
6	Go for organic cotton and bio-degradable cleansers to reduce water pollution.

3. Combat Climate Change

1	Eat more vegetables and less meat.
2	Choose local food sources to reduce food miles.
3	Take public transport, bicycles and other low-carbon transportations.
4	Save electricity by switching off unnecessary power completely.
5	Choose renewable energy if possible.
6	Conserve forests by choosing sustainable wood products produced by sustainable forest management practices e.g. certified Forest Stewardship Council® products.

4. Support and Promote Wetland and Biodiversity Conservation

1	Pay more attention to news about wetlands and development projects in your community.
2	Participate in public consultations and voice out your opinions on wetland development projects.
3	Participate in voluntary work e.g. help removing invasive species in wetlands.
4	Share your experience in wetlands with your friends and family on social media and let them know the importance of wetlands.
5	Be a citizen scientist and help perform ecological surveys and research.
6	Support and use eco-friendly products.

Let's build a future together with Lolo in which people live in harmony with nature!

D. “LoLo’s Flying Journey” Game Board

To implement this game, please print out the following Game Board, Energy Points and Checkpoint cards.



VOLOO'S FLYING JOURNEY

- Education Game Pack -



INCHEON

Incheon Card 1 Interpretation

Facts about the scenario:

- Republic of Korea is one of the biggest breeding ground for Black-faced Spoonbills in the world. One known breeding site is on some small islands off the west coast of the Republic of Korea.

	Impacts on Environment	Impacts on Economy	Impacts on Society
The biggest breeding site is on the Gujido in Yeonpyeong-do, island between Republic of Korea and Democratic People's Republic of Korea. The site is free of human disturbance.	+		
Black-faced Spoonbills are found nesting on a small man-made island in Namdong Reservoir since 2009. By 2016, nearly 300 Black-faced Spoonbills have been breeding in the area. It is now one of the most important breeding sites of Black-faced Spoonbills in the world.	+		
The small man-made island is located in the urban area, which helps raise public awareness of waterbird conservation.	+		+

1



An artificial wetland is created. Black-faced Spoonbills can reproduce successfully.



Incheon Card 2 Interpretation

Facts about the scenario:

- Saemangeum Tidal Flat Reclamation Project is the biggest reclamation project in the world (equivalent to 4 times of Hong Kong's total area), it transformed mudflat into new land for development. The project was completed in 2010.
- Although Saemangeum is not in Incheon (but is nearby), it is still included in the game because of its significant impact.

	Impacts on Environment	Impacts on Economy	Impacts on Society
The reclaimed land was planned for agricultural use, but the Government changes its mind to develop an economic hub for global trade.		+	
Saemangeum Tidal Flat was the second-largest mudflat in the world, also one of the highest ecological value habitats in Asia. However it lost over 90% of shorebirds when compared with the data before the reclamation.	—		
Saemangeum used to be an important stopover habitat for waterbirds.	—		
The loss of shellfish due to the pollution from the reclamation work affects the livelihood of local fishermen. The degraded water quality also stops the reclaimed land from being used for the original purpose - agricultural use.		—	—

2



Coastal reclamation work continues.
Important habitats for waterbirds and marine life are destroyed.



Incheon Card 3 Interpretation

	Impacts on Environment	Impacts on Economy	Impacts on Society
The policies protect important habitats for wildlife. Citizens appreciate and enjoy spending time in the natural environment nearby and live in harmony with nature.	+		+
Citizens are willing to conserve waterbirds.	+		+
Non-Governmental Organization (NGO) sets up education programmes to raise the public's awareness on wetland conservation issues.	+		+

3



The Government's conservation policies are supported by citizens.



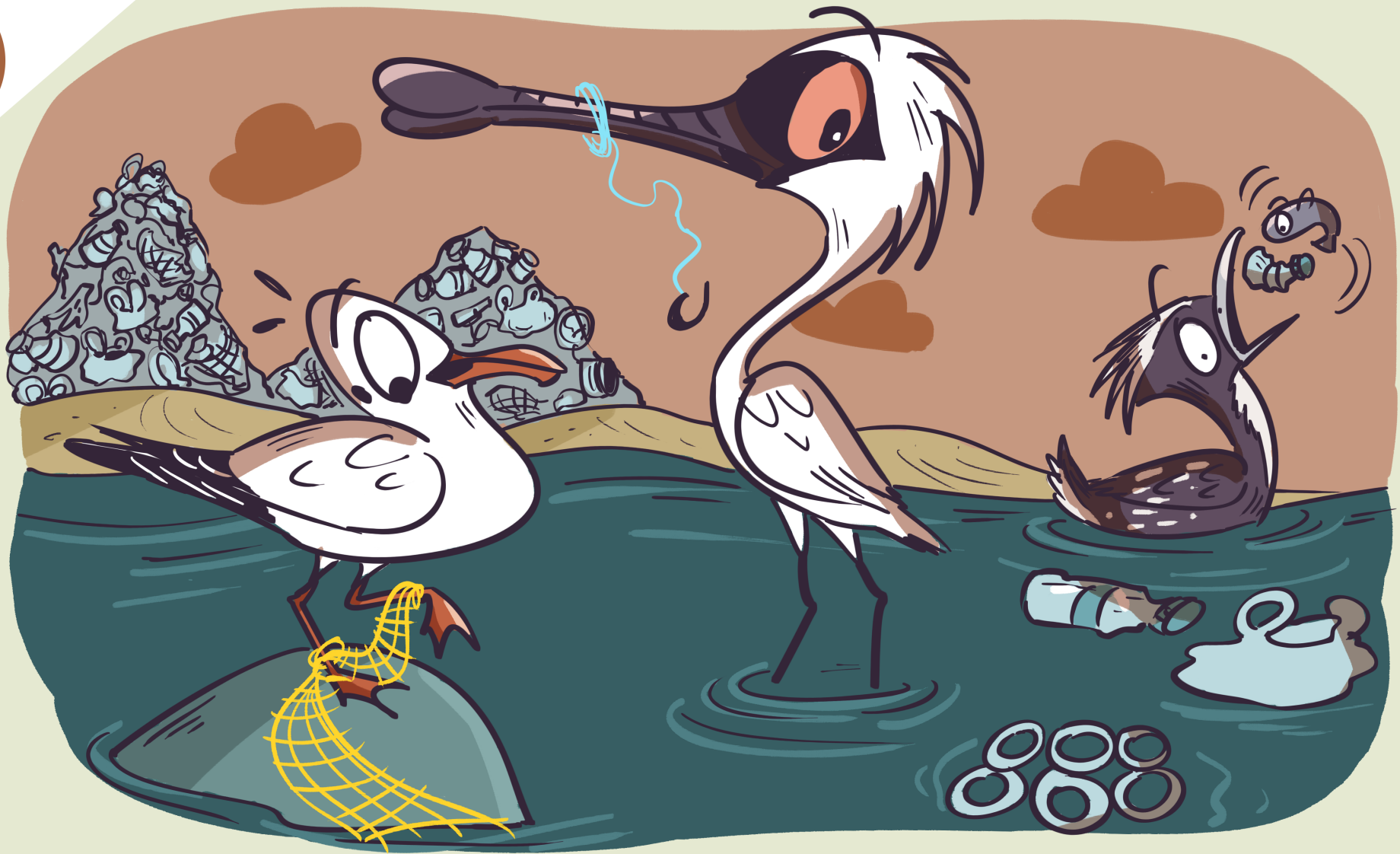
Incheon Card 4 Interpretation

Facts about the scenario:

- Land-based activities are the major source of marine litter, such as recreational activities, unregulated landfills and littering located near the coast. Rivers also carry litter from inland to the sea.

	Impacts on Environment	Impacts on Economy	Impacts on Society
Irresponsible fishing activities left fishing debris such as fishing lines and hooks in wetlands. Waterbirds get hurt by swallowing fishhooks or getting caught in fishing debris, swallowing lead sinkers may also result in poisoning.	■		
Black-faced spoonbills sweep their spoon-like bill in water to find food. This foraging habit makes their bill easily tangled in fishing lines or hooks. They may use marine litter to build their nest, so their offspring are also threatened.	■		
Marine microplastics can be ingested by a wide range of marine animals, which then become food of waterbirds. Marine litter ingestion is a contributing factor to waterbird mortality.	■		
Marine litter has huge impact on economy and society. It brings extra cost to cleaning, pollution and damage handling, bad visitor experience and public health.		■	■

4



Black-faced Spoonbills are harmed by abandoned leisure fishing gear and other marine litter!





MUNDOK ↑

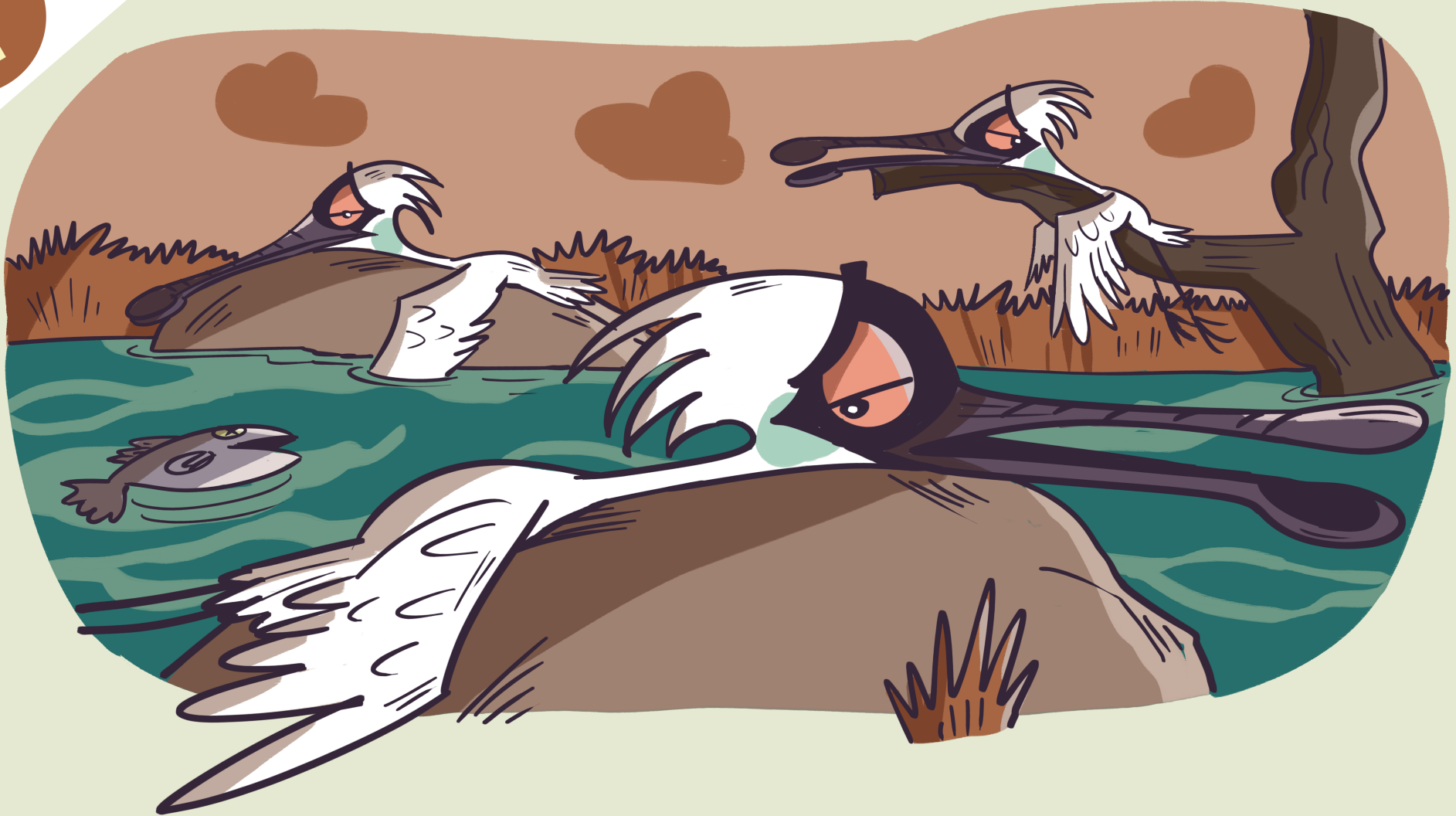
Mundok Card 1 Interpretation

Facts about the scenario:

- Avian botulism is a fatal illness of birds caused by a toxin produced by bacteria. Birds can be infected via consumption of infected fish.

	Impacts on Environment	Impacts on Economy	Impacts on Society
The outbreak of Avian Botulism has been reported all over the world, Black-faced Spoonbills are also affected. Dozens of death cases were recorded in 2003.	■		
Botulism is also a potential threat to human being and domestic poultry.		■	■
Sporadic infection of avian influenza in Black-faced Spoonbills can still be recorded in recent years. This disease caused a negative impact on both ecosystem and humans.	■		■
Scientists suggest that global warming may favour the bacteria and the outbreaks will become more frequent.	■		

1



Mysterious disease occurs!

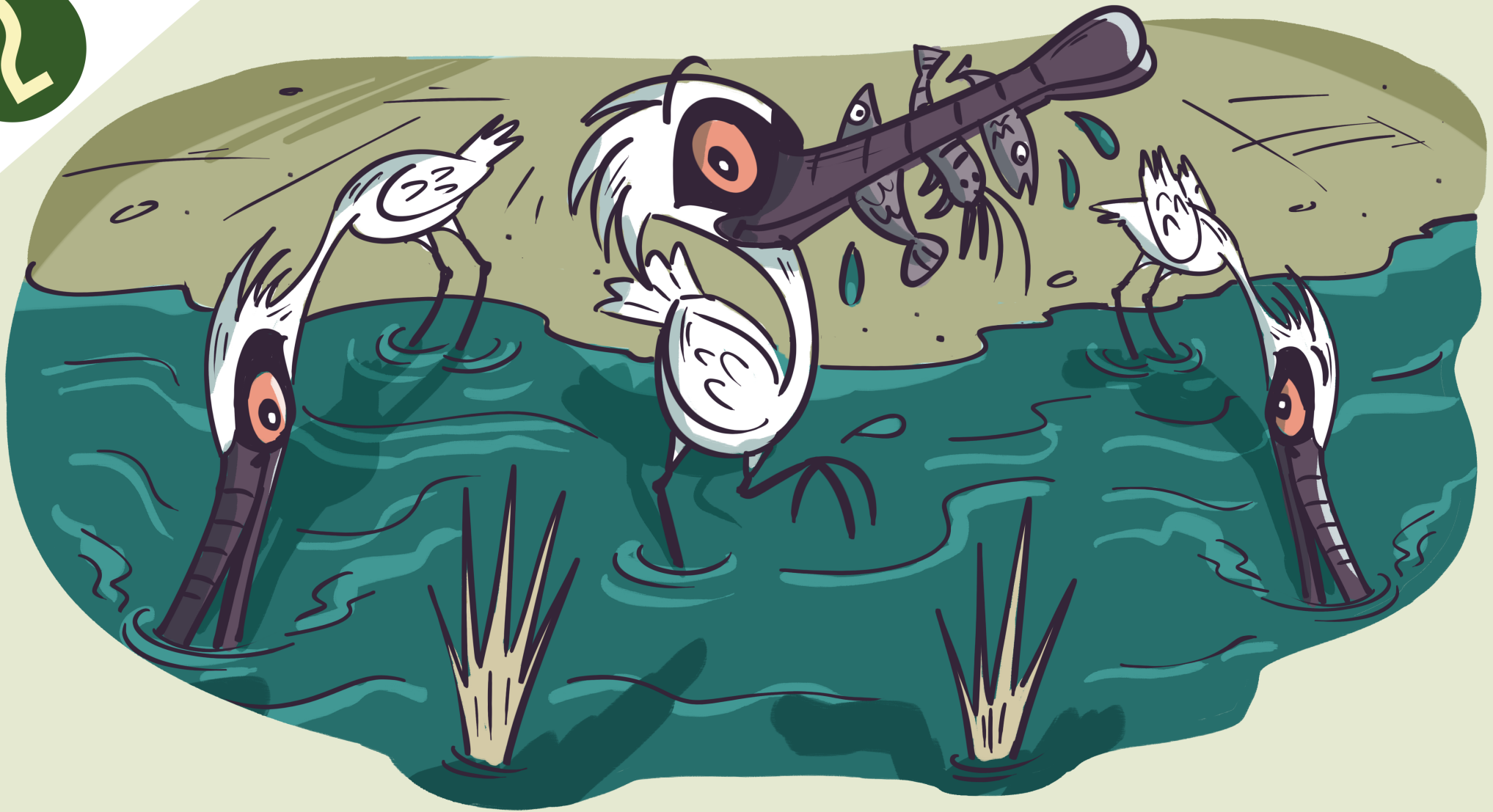


Mundok Card 2 Interpretation

Facts about the scenario:

- Feeding behaviour: Black-faced Spoonbill feed in shallow water. They sweep their partly opened bills from side to side to search for prey in the water. Once their bill senses prey with suitable size, they will catch it and swallow it.
- Diet: They mainly feed on fish and shrimps.

2



Let's feast to prepare for the migration! How do Black-faced Spoonbill feed?



Mundok Card 3 Interpretation

Facts about the scenario:

- The “Ramsar Convention” is an intergovernmental treaty adopted on 2 February 1971 in the Iranian city of Ramsar. Thus, any sites designated under this treaty are called Ramsar Sites.
- The Convention’s mission is the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world. Both wetland (including birds and other wildlife) and people benefit from the conservation and wise use of wetlands.
- The “East Asian – Australasian Flyway Partnership (EAAFP)” was established in 2006, with 39 Partners from National Government, Intergovernmental Organization, international NGOs and Private Company.
- EAAFP developed the “Flyway Site Network”. It is the network of internationally important wetlands used by migratory waterbirds throughout the East Asian-Australasian Flyway. The Flyway Network Site should be sustainably managed and secure interconnectedness among the international important sites to ensure the long-term survival of migratory waterbirds. Over 150 sites among 19 countries and continents are in this network.

	Impacts on Environment	Impacts on Economy	Impacts on Society
Mundok Migratory Bird Reserve, which covers 3,715 hectares, has been designated as a Ramsar Site and Flyway Network Site in 2018.	+		
This wetland is crucial in providing over 50,000 migratory waterbirds with stopover points when migrating along the East Asian - Australasian Flyway, between Arctic Siberia and Alaska, all the way down to Australia and New Zealand.	+		

3



Coastal Ramsar Sites and Flyway Network Sites are established;
Black-faced Spoonbills' flyway is conserved.



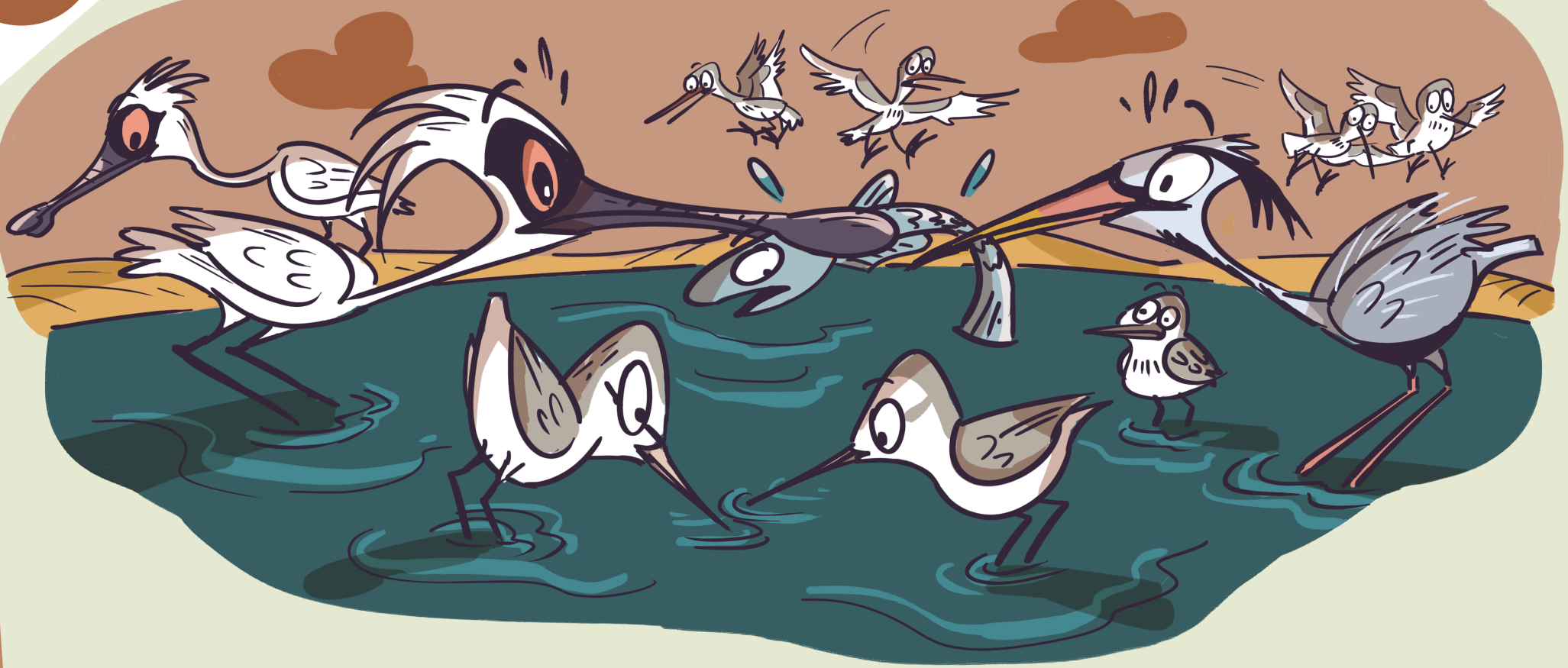
Mundok Card 4 Interpretation

Facts about the scenario:

- A significant increase in the population of birds or other wildlife at one location should be taken as a warning signal

	Impacts on Environment	Impacts on Economy	Impacts on Society
Development decreases the availability of suitable roosting areas and food for birds, forcing them to congregate in the same location. The competition for food and space among the birds becomes intense.	■		
Possible impacts of climate change include increasing temperatures, more flooding and desertification, which may result in the continued reduction of suitable habitat for Black-faced spoonbill.	■		
Scientists predict that the wintering range of Black-faced spoonbills will move northward and will shift closer to its breeding grounds over time because of climate change. How this affects their timing of arrival at breeding grounds and reproductive success is still unknown.	■		
Climate change also has negative impacts on the economy and society, such as decreasing crop yields, spreading disease, and flooding coastal cities, etc.		■	■

4



Affected by climate change, wetlands become more crowded, which leads to a shortage of food, suitable habitats and resources.





KYUSHU

Kyushu Card 1 Interpretation

	Impacts on Environment	Impacts on Economy	Impacts on Society
Development on wetlands destroys the environment that is home to a variety of wildlife.	—		
Shinkansen, the new efficient electric railway system provides a fast and clean mass and public transportation system for citizens compare to private transportation like cars.	+		+
People save time on transportation and it also improves the air quality in the city.	+		+

1



Transport development destroys wildlife habitats.



Kyushu Card 2 Interpretation

Facts about the scenario:

- When tide comes in and water covering the tidal flats, waterbirds need to stay in high tide roosting site (natural or artificial wetlands), where the birds can forage (feed) and rest during the high tide period.

	Impacts on Environment	Impacts on Economy	Impacts on Society
When a development destroy natural wetlands, a responsible developer recreates artificial wetlands as a mitigation measure to compensate the loss of wetland and manages it to enhance biodiversity. In some countries, developers are legally obliged to do this.	+		
The value of wetlands is still underdetermined. There is a recent study showing the importance of high-tide roosting sites to migratory waterbirds, especially in developed coastal areas.	+	+	
The artificial wetland can serve as a new place for people to get in touch with nature.	+		+

2



High tide roosting site is created.

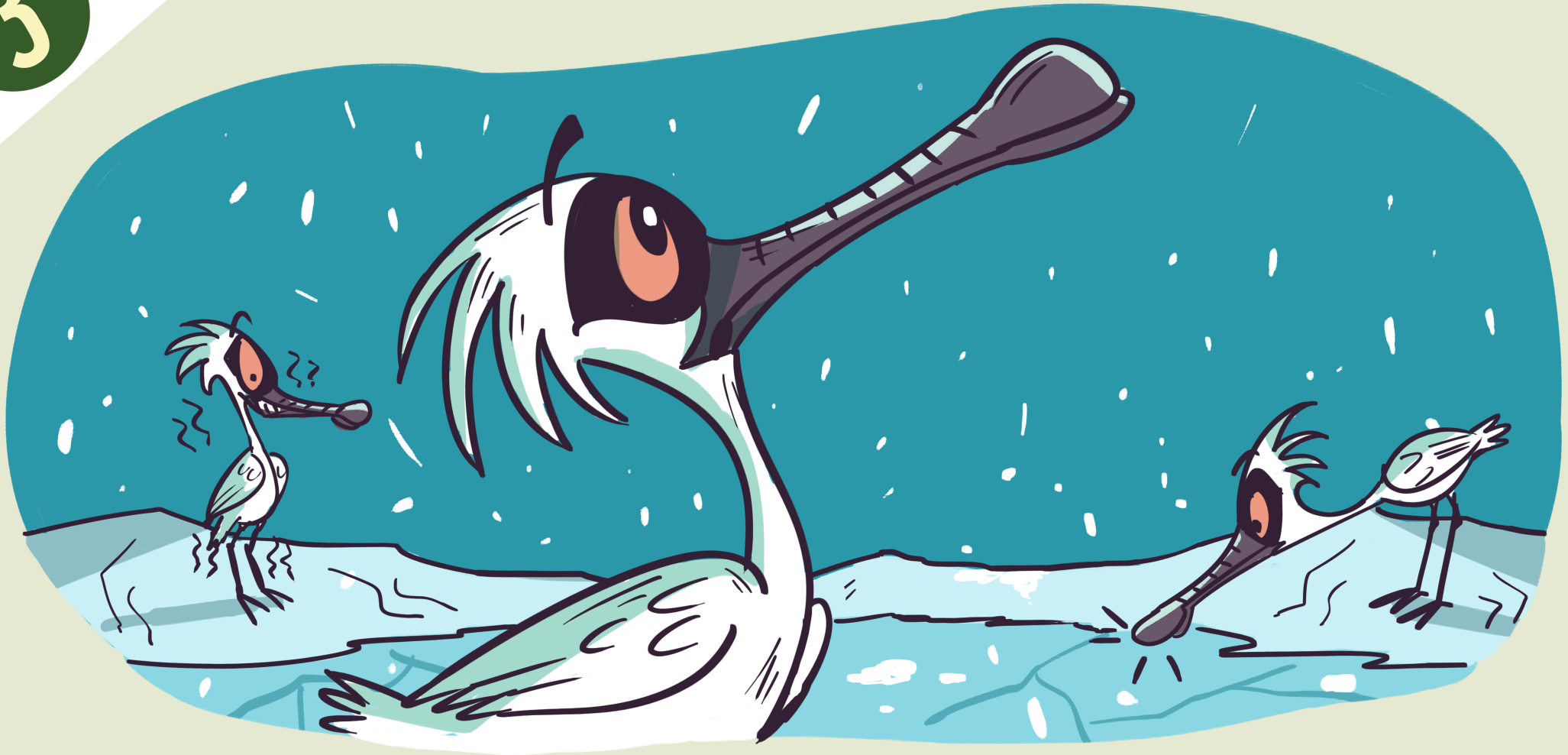


Kyushu Card 3 Interpretation

Facts about the scenario:

- In winter, Black-faced Spoonbills migrate from northern breeding areas, where food availability drops due to the cold, to southern wintering grounds for food resources. They return to northern breeding grounds after winter.

3



Why do Black-faced Spoonbills migrate?

+3

(Correct)

-3

(Wrong)

Kyushu Card 4 Interpretation

Facts about the scenario:

- Long-distance migration is very energy-demanding for migratory birds. They need to eat as much as they can beforehand to store sufficient energy for the journey.
- Stopover sites with sufficient food available is crucial for a successful migration.
- Every year birds are able to cover thousands of kilometers with the help of a few key stopover sites where they can ‘refuel’.

	Impacts on Environment	Impacts on Economy	Impacts on Society
Climate change causes stronger typhoons and more extreme weather. Migratory waterbirds face more challenges when crossing the sea.	—		

4



Flying across the sea uses up most of the birds' energy reserves. Climate change brings more extreme weather and challenges to Black-faced Spoonbills.





FUJIAN

Fujian Card 1 Interpretation

Facts about the scenario:

- Protected wildlife in China is divided into 2 categories (Class I and Class II) based on their rarity and importance. Wildlife listed on Class I receives the highest level of protection.
- The List of threatened and protected species of China has been updated in 2021, and will be updated every 5 years thereafter.
- Class I Protected Animals include: Black-faced Spoonbill, Giant Panda, Chinese White Dolphin and Pangolin etc.
- Class II Protected Animals include: Chinese Bullfrog, Golden Birdwing, Chinese Horseshoe Crab, and Chinese Three-striped Box Turtle etc.

	Impacts on Environment	Impacts on Economy	Impacts on Society
The Chinese government has laws to protect endangered wildlife.	+		
In 2020, the Chinese government banned hunting, trading, transporting and eating of wild animals protected under the Wildlife Protection Law of the People's Republic of China and other relevant laws and regulations.	+		

1



Black-faced Spoonbills and other threatened wildlife are legally protected.

+4

Fujian Card 2 Interpretation

Facts about the scenario:

- Fujian fishermen capture mudskippers in mudflats because they can be used as food or medicine. Mudskippers can be sold at a good price as well.

	Impacts on Environment	Impacts on Economy	Impacts on Society
The fish nets and traps are potential threats to waterbirds on the mudflat.	—		
The over exploitation of fishery resources by fishermen significantly decreases the amount of food available for other wildlife especially waterbirds.	—	+	
Mudskippers and waterbirds are also disturbed by the fishing activity on mudflats.	—		
Unsustainable fishing practices result in unrecoverable damage to fishes, resources and an imbalance in the food chain. This also leads to insufficient seafood reaching the markets and fishermen losing their jobs.	—	—	—

2



Fishermen compete with Black-faced Spoonbills and disturb waterbirds in coastal areas.



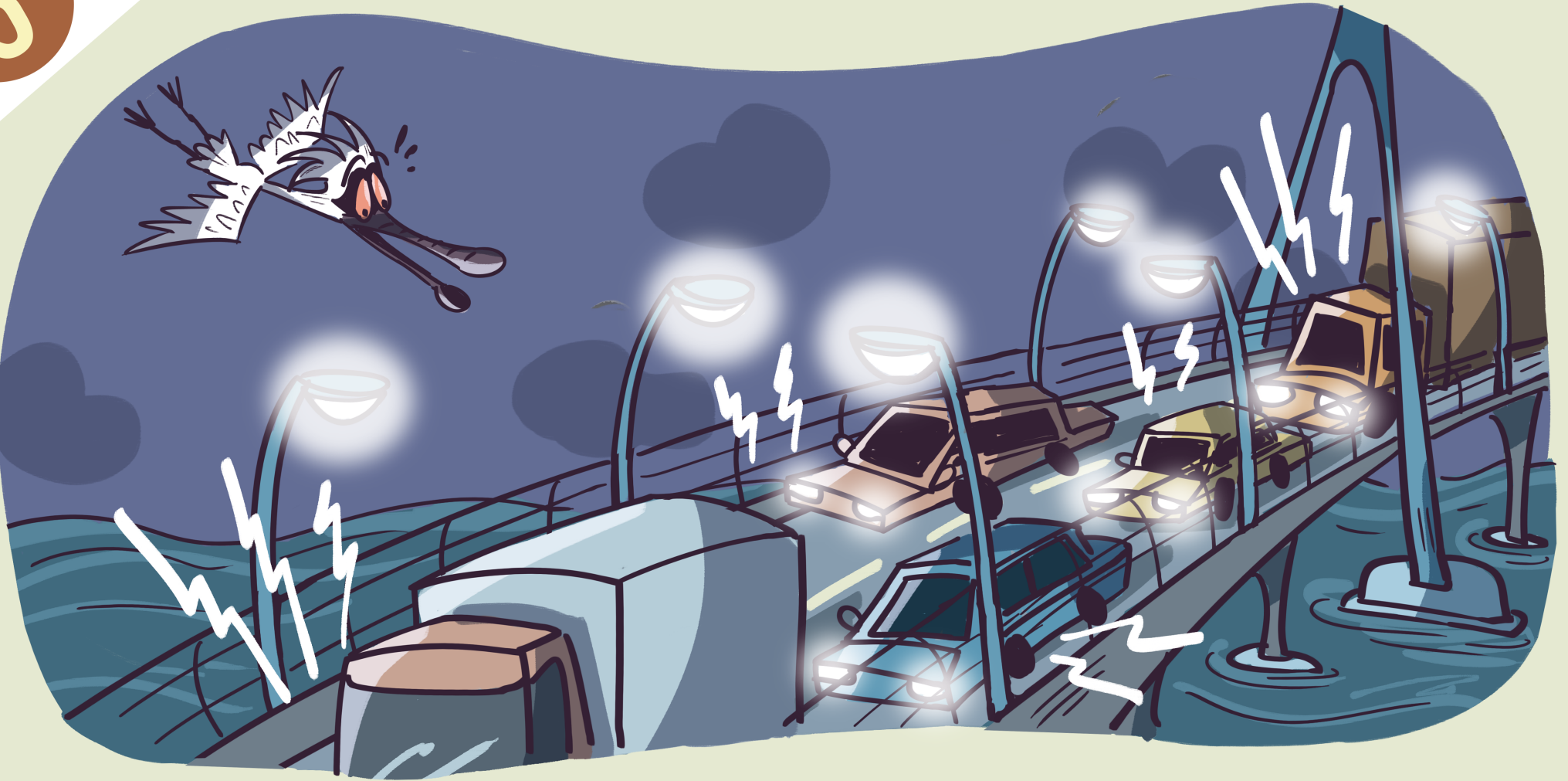
Fujian Card 3 Interpretation

Facts about the scenario:

- Minjiang River estuary is an important stopover site for Black-faced Spoonbill migration. 137 Black-faced Spoonbill were recorded in that area in the 2020 bird survey.
- Minjiang River estuary has been designated as a national nature reserve since 2013.
- The construction of Fuzhou Ring Expressway (southeast section) started in 2016. Part of the bridge spans the Minjiang River Estuary Wetland National Nature Reserve.

	Impacts on Environment	Impacts on Economy	Impacts on Society
Better transportation network benefits citizens and boosts the local economy.		+	+
Wildlife especially birds are highly affected by noise produced from the bridge construction and traffic. The noise may intimidate birds or disrupt songbirds.	—		
Some migratory birds navigate by the position of the Sun, Moon and stars. Light pollution may disorient them or lead them to somewhere dangerous. They may waste extra time and energy on detouring to avoid the lights, as well as increase their exposure to predators.	—		
The artificial light disrupts the circannual rhythm of migratory birds, affecting their judgement on starting time of migration. They may miss ideal conditions for breeding, foraging etc. during migration.	—		

3



The traffic noise and artificial light are so disturbing!



Fujian Card 4 Interpretation

Facts about the scenario:

- Birds navigate by a number of means such as
 1. Using the position of the sun, moon and stars;
 2. Following the outlines (topography) of mountains or coastlines;
 3. Sensing the Earth's magnetic field.
- Nevertheless, a small proportion of birds fly the wrong way during migration, could be due to bad weather, disorientation by human-induced factor like light pollution, and other factors.

4



Are you lost? How do Black-faced Spoonbills navigate along the migratory route?





◀ TAINAN

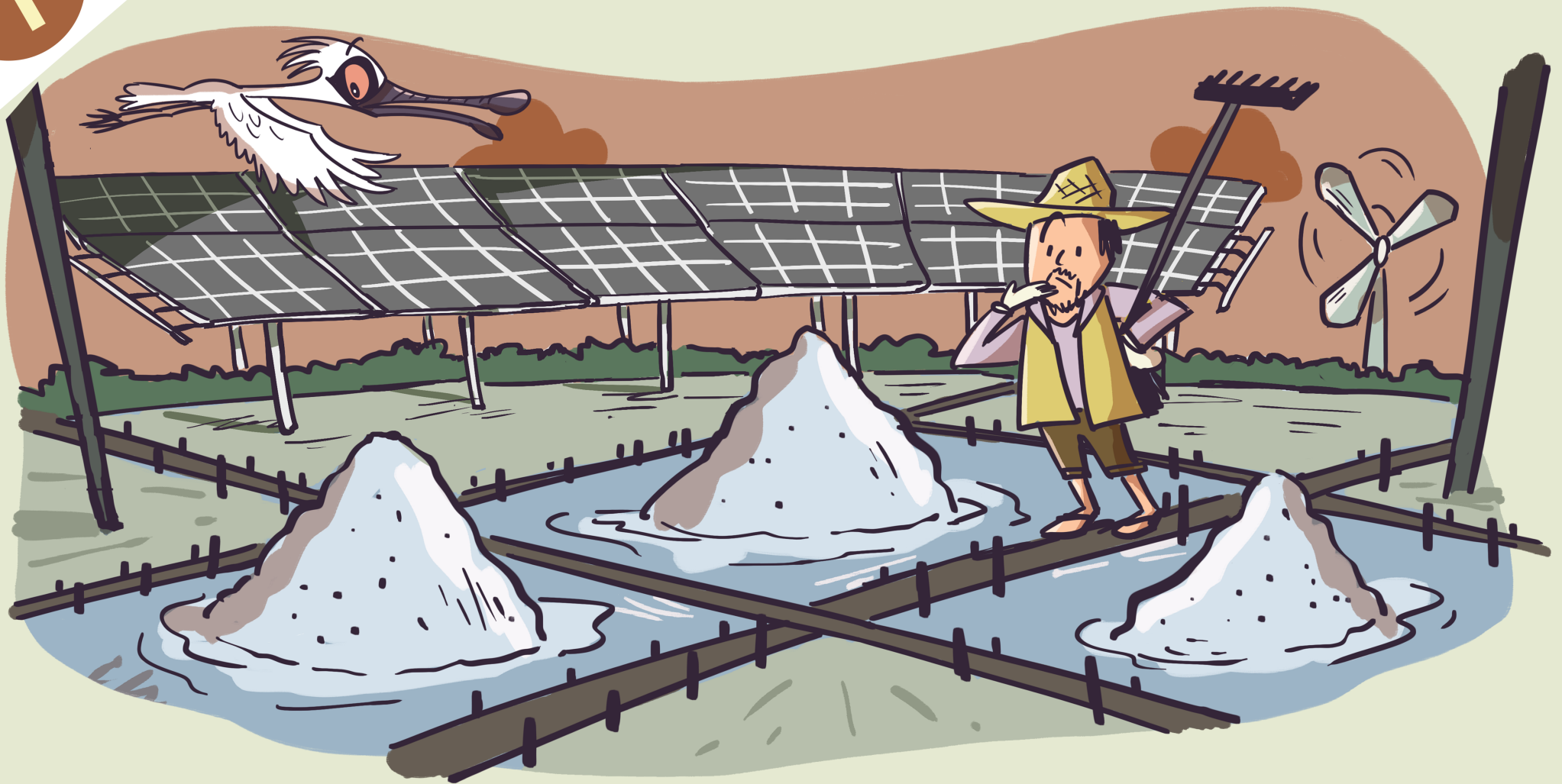
Tainan Card 1 Interpretation

Facts about the scenario:

- The salt pans have been left untouched for decades because of the salt industry decline. They became diversified ecosystems that provide habitats for different wildlife.
- Some plants and many small animals, such as worms, fish, shrimp and insects are found in salt fields. They are important food source for waterbirds including Black-faced Spoonbills.

	Impacts on Environment	Impacts on Economy	Impacts on Society
Renewable energy such as solar and wind energy is more environmentally-friendly when compared to fossil fuel. The renewable energy generation process is more sustainable and cleaner - less greenhouse gas and air pollutants are generated.	+		
102 hectares of the Budai Salt Pan Wetlands has been allocated to a solar power project ,reducing the foraging ground of waterbirds. Part of the salt field in Tainan has already been transformed into solar panel fields, and the government is planning to expand the area.	-	+	+
Wind turbines are also a big problem for migratory waterbirds They may crash into turbines causing severe injury or death. Detouring wastes their time and energy as well.	-		
Appropriate management for salt pans has been lacking for a long time. Their condition and quality are very fluctuate and are not always suitable for waterbirds.	-		

1



Salt pan, artificial habitat for wildlife shrinks because of renewable energy development and lack of management.



Tainan Card 2 Interpretation

Facts about the scenario:

- Ecotourism is a kind of nature-based tourism done in a sustainable, responsible and educational way.

	Impacts on Environment	Impacts on Economy	Impacts on Society
Ecotourism gives people an opportunity to get close to nature whilst minimizing their ecological impact.	+		+
The revenue generated by tourists can also support the livelihood of local people.		+	
Participants are encouraged to "take nothing but photographs, leave nothing but footprints."	+		+

2



Responsible ecotourism allows people to enjoy nature without disturbing wildlife.

+4

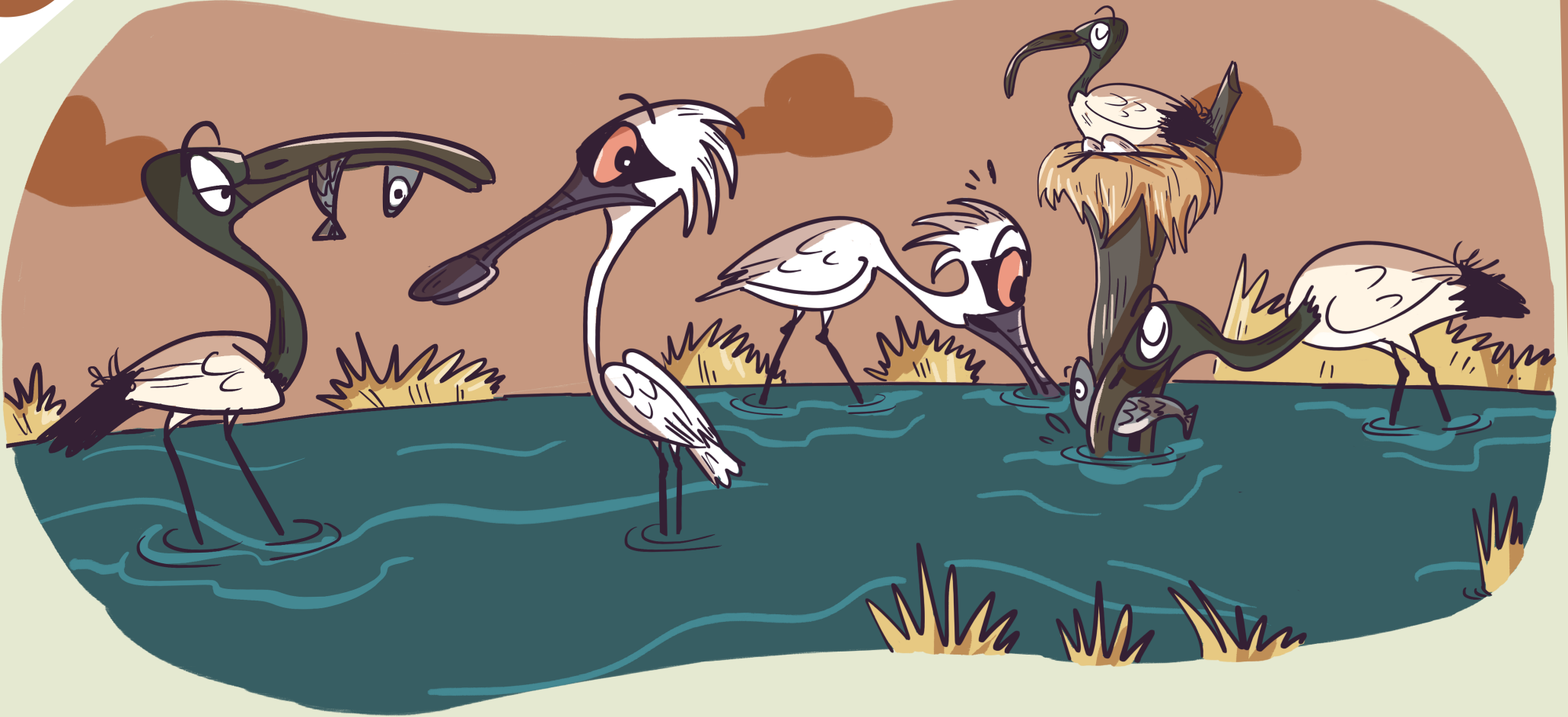
Tainan Card 3 Interpretation

Facts about the scenario:

- Invasive species is an organism introduced outside its natural habitat, and alters its new environment negatively.

	Impacts on Environment	Impacts on Economy	Impacts on Society
African Sacred Ibises have threatened native waterbirds by competing for food with them and occupying their feeding and nesting sites.	■		
Other invasive species like Mikania weed and Golden Apple Snail increase the habitat degradation rate.	■		
Invasive species cause huge loss, not only to the ecosystem, but also to the economy. Degraded habitats require extra resources for restoration and management, and removal or control projects also impose significant costs on governments and society.		■	■

3



Invasive species are competing against Black-faced Spoonbills for resources.



Tainan Card 4 Interpretation

Facts about the scenario:

- Natural history is the study of organisms.

	Impacts on Environment	Impacts on Economy	Impacts on Society
A better understanding of nature helps in the effective management and protection of species and their environment.	+		
In the case of Black-faced Spoonbills, scientists have identified their migratory routes through ringing and satellite tracking. By doing so, important roosting sites along the flyway have been identified and conserved by local governments.	+		
Scientists also put unique colour bands and numbers on their legs (similar to Identity Card number). This important data will be shared among scientists and bird watchers in different countries. By doing so, we can identify an individual Black-faced Spoonbill in the field through a telescope.	+		
An annual international survey on Black-faced Spoonbill has been carried out since 1994, covering over 100 sites in the East Asian-Australasian Flyway, including Tainan. With support from the researchers, bird experts and citizen scientists, the survey provides important data for the conservation work of Black-faced Spoonbill.	+		+

4



Scientists gather more information on natural history of Black-faced Spoonbill.





Mai Po Card 1 Interpretation

Facts about the scenario:

- In Asia, people living in coastal areas have hundreds of years of experience cultivating shrimps using ponds (traditionally known as *gei wai*) located near bays or estuaries.

	Impacts on Environment	Impacts on Economy	Impacts on Society
<i>Gei wai</i> , (literally meaning a pond enclosed by a man-made dam) is used for cultivating shrimps, fish, oysters, seaweed and crabs.		+	
In Hong Kong, the only traditionally operated <i>gei wais</i> remaining are located in Mai Po Nature Reserve. WWF Hong Kong, who is responsible for managing the reserve, still uses the traditional <i>gei wai</i> approach for wildlife and culture preservation,	+		+
The <i>gei wai</i> habitat in Mai Po Nature Reserve is actively managed to keep them in good shape and attractive to waterbirds. Examples of active management includes water level management, regular plant trimming, sedimentation rate monitoring, etc.	+		
The <i>gei wai</i> method is a very good example to demonstrate how coastal wetlands can be managed sustainably, with both economic and ecological benefits.	+	+	

1



Traditional shrimp ponds (*gei wai*) provide food for humans and wildlife.

+4

Mai Po Card 2 Interpretation

Facts about the scenario:

- Mai Po Nature Reserve is the core roosting site for Black-faced Spoonbill in Hong Kong. The site’s high biodiversity also helped get it recognised as a Wetland of International Importance under the Ramsar Convention. Human activities are restricted in this site.
- There are still some private fishponds in Mai Po. The Fish farmers may have their watchdog or even set traps to guard their property.

	Impacts on Environment	Impacts on Economy	Impacts on Society
Stray animals and free-ranging pets are threats to wildlife, including Black-faced Spoonbill. Stray dogs and cats catch wild animals as food, compete with them for resources and even spread diseases.	■		
Traps around fishponds can be fatal to Black-faced Spoonbills.	■		

2



Black-faced Spoonbills may get hurt when resting in fishponds.



Mai Po Card 3 Interpretation

	Impacts on Environment	Impacts on Economy	Impacts on Society
Although human activities within Mai Po Nature Reserve have been well managed, water resources can still be contaminated by neighbouring areas. Water pollution has been negatively affecting this habitat.	■		
Urban development produces excessive air and water pollutants, which can contaminate food sources such as fish that are consumed by humans and other wildlife.	■		■
Pollutants produced by urban development also cause additional treatment costs.		■	

3



Black-faced Spoonbills feel sick after eating contaminated fish!



Mai Po Card 4 Interpretation

Facts about the scenario:

- Adopt a more sustainable lifestyle to protect Black-faced Spoonbills and the wetlands with the following 4 areas of tips.

	Impacts on Environment	Impacts on Economy	Impacts on Society
<u>Reduce Unnecessary Waste</u> <ul style="list-style-type: none"> • Stop and think whether the item is necessary before purchasing. • Reduce unnecessary single-use products, choose reusable ones. • Bring your own shopping bags. • Bring your own bottle, don't buy bottled drinks. • Bring your own container and utensils for takeaway food. • Choose products with minimal packaging, reduce unnecessary plastic packaging. 	+	+	+
<u>Treasure Water Resources</u> <ul style="list-style-type: none"> • Don't rinse your hands, clothes or vegetables under a running tap. • Take short showers instead of baths. • Only run washing machines or dishwashers with a full load. • Defrost frozen food by moving it from the freezer to the fridge the day before, instead of putting it under running water. • Check your water bill regularly and reflect on your water use habits. Try to set a target to reduce water consumption. • Go for organic cotton and bio-degradable cleansers to reduce water pollution. 	+	+	+
<u>Combat Climate Change</u> <ul style="list-style-type: none"> • Eat more vegetables and less meat. • Choose local food sources to reduce food miles. • Take public transport, bicycles and other low-carbon transportations. • Save electricity by switching off unnecessary power completely. • Choose renewable energy if possible. • Conserve forests by choosing sustainable wood products produced by sustainable forest management practices e.g. certified Forest Stewardship Council® products. 	+	+	+
<u>Support and Promote Wetland and Biodiversity Conservation</u> <ul style="list-style-type: none"> • Pay more attention to news about wetlands and monitor development projects near wetlands. • Participate in public consultations and voice out your opinions on wetland development projects. • Participate in voluntary works e.g. help removing invasive species in wetlands. • Share your experience in wetlands with your friends and family on social media and let them know the importance of wetlands. • Become a citizen scientist and help perform ecological surveys and research. • Support and use eco-friendly products. 	+	+	+

4



What can students do to conserve Black-faced Spoonbills and the environment?



Journey Completed Page Interpretation

Facts about the scenario:

- Remind students this is not the very end of the journey. After the winter, they (as Black-faced Spoonbills) will go back to the north for breeding.
- Some species, for example Bar-tailed Godwit, even fly from Alaska all the way down to New Zealand and Australia.
- The Black-faced Spoonbill in the picture with the ring “A49”, has had a successful migratory journey between Mai Po and Incheon. It was rescued in Hong Kong in winter 2020 when its right wing was injured. After treatment, a bird ring “A49” was attached to it before it was released in Mai Po. Through the transmitter record, “A49” successfully returned to Incheon in summer for breeding, and revisited Hong Kong in Dec 2021 and stayed during winter.

CONGRATULATIONS! YOU HAVE
COMPLETED YOUR JOURNEY
SUCCESSFULLY!





**This game is based on an original idea by Barrie Cooper,
former International Education Manager,
the Royal Society for the Protection of Birds.
(The RSPB is the UK representative of BirdLife International.)**







INCHEON



MUNDOK ↑



KYUSHU



FUJIAN



◀ TAINAN



MAI PO