

攜手保護濕地 CARING FOR WETLANDS

應對氣候變化
an answer to climate change

世界濕地日
World Wetlands Day

濕地、生物多樣性與氣候變化 Wetlands, Biodiversity and Climate Change

濕地公約秘書處以「濕地、生物多樣性與氣候變化」作為2010年「世界濕地日」的主題，藉此喚起大家關注生物多樣性的損失及人為引致的氣候變化。聯合國亦把2010年定為「國際生物多樣性年」，期望於該年達至將生物多樣性的損失在全球、區域及國家水平上會有大幅度的下降。

我們知道健康的濕地能透過它所提供的功能，緩和氣候變化所帶來的壞影響，因此濕地公約秘書處亦以「攜手保護濕地，應對氣候變化」作為2010年「世界濕地日」的口號。

濕地是很多動物賴以維生的棲息環境
Wetlands are important habitats that support a variety of organisms.



The Ramsar Secretariat has chosen "Wetlands, Biodiversity and Climate Change" as the theme for the 2010 World Wetlands Day, in order to raise the awareness of biodiversity loss and human-induced climate change. The United Nations has also declared 2010 as the International Year of Biodiversity. 2010 is set as the target year to reduce the current rate of biodiversity loss significantly at the global, regional and national levels.

It is known that healthy wetlands can alleviate the impacts of climate change through performing their functions. Therefore, the Ramsar Secretariat has announced "Caring for Wetlands - an answer to climate change" as the slogan for the 2010 World Wetlands Day.



2008年10月於韓國昌原舉行的第十屆拉姆薩公約締約國大會曾討論濕地、生物多樣性與氣候變化的課題
Topics related to wetlands, biodiversity and climate change have been brought to the 10th Meeting of the Conference of the Contracting Parties of Ramsar Convention in Changwon, Korea in October 2008



氣候變化對生態系統以及水供應構成影響
Climate change has caused a significant impact to the ecosystem and water supply

濕地的重要性與功能 The importance and functions of wetlands

濕地是水與陸地的相匯之處，約佔全球土地面積的百分之六。因應地理及氣候上的差異，濕地的類型也各有不同，由寒溫帶至溫帶的泥炭沼澤，到熱帶的泥洪森林，以至沿岸的紅樹林、山巒深谷中的河流溪澗，甚至是人類開闢的魚塘或濕耕農地也是濕地。

健康的濕地有很高的生物多樣性，以及提供生態系統功能，讓人類從中獲益：例如淨化水體、處理污水、提供淡水及魚獲、減低風暴和洪水所造成的破壞、保護沿岸生境、儲藏碳，以及作為學習及消閒用途。此外，健康的濕地會有較大的恢復能力，縱使周遭環境轉變，它們仍可維持正常的功能。

總括而言，濕地的重要功能大致可分為四大類(見右表)：

1. 儲水調節 · 保護生境
Reservoir for water level control and habitat protection
2. 阻隔廢物 · 潔淨水源
Natural filter for water cleansing
3. 棲息生境 · 供應糧食
Home for animals, supply of food and resources
4. 地球碳庫 · 平衡循環
Earth's carbon storage to facilitate carbon cycling

Wetlands are places where water connects to land. They occupy around 6% of the total surface area of the Earth. Due to the differences in geography and climate, there are different types of wetlands varying from peatlands around the cold temperate to temperate region, to mangrove swamp in tropical areas, rivers and streams in mountains and hills, as well as man-made ponds or wet farmlands, are different examples of wetlands.

Healthy wetlands have high biodiversity. They provide ecosystem services which benefit human, for example, water purification, waste treatment, provision of freshwater and fishery products, protection against storm and flooding, carbon storage, and places for study and recreation. Healthy wetlands have greater ecosystem resilience, which means they can maintain the ecosystem services under changing conditions.

In general, there are four major functions of wetlands (see table on left):



紅樹林沼澤除了可以保護海岸線外，它也是魚類、甲殼類、水生脊椎動物和多種生物的庇護所
Mangrove swamp protects coastal line, and provides shelter for fishes, crustaceans, aquatic vertebrates, and a variety of living organisms



我們的消閒或學習活動，不少都是在濕地進行
Many of our leisure or learning activities take place at wetlands



長久以來，人類聚居於河流附近
Human settlements have been developed near rivers



山巒深谷中的河流溪澗，以至人類開闢的濕耕農地也都濕地
Rivers and streams in mountains and hills, and man-made wet farmlands are also known as wetlands



部份位於溫帶的濕地是在冰雪融化後才會形成
Some wetlands in the temperate region are formed only after the snow melts

泥洪森林經歷季節性的河水氾濫，被水淹浸的樹木，提供了多樣性的環境，讓不同的動物居住
Flooded forest is a woodland area which is being flooded seasonally. Trees growing on the waterlogged substratum provide a range of habitats for animals



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儲水調節・保護生境

Reservoir for water level control and habitat protection



►紅樹林除了為生物提供棲息生境外，更是保護海岸線的天然屏障。In addition to providing living places for animals, mangroves also act like a natural barrier to protect the shoreline.

Wetlands serve as a huge sponge storing 30% of the freshwater on earth. During dry seasons, the water stored in wetlands is discharged slowly towards nearby habitats to regulate the water level. Plants near the wetlands can access safeguarded from wilting, and animals can access to the water supply. In addition, aquatic plants absorb water and enhance the water storing capability of wetlands. The water stored in wetlands also infiltrate into the soil and replenish the groundwater. This facilitates hydroponics.

During storming season, prolonged rainfall results in the rise of water level, causing rapid flow in rivers and flooding. Some wetlands, such as ponds and marshes, can store large amount of water, relieving the pressure of flooding. Wetland plants grow within streams and rivers act like barriers which slow down the water current. The roots of the plants can hold the soil tightly, preventing it from being washed away by water current, and thus protecting the riverbank.



►濕地慢慢釋出儲存的水分，令植物得到滋潤，動物能找到水源。Water stored in wetlands will discharge slowly, to safeguard plants from wilting, and to provide source of water to animals.

濕地好像一塊大海棉，儲存大自然中的水分，而湖泊、沼澤及泥炭沼等濕地所儲存的水分佔了全球淡水量的百分之三十。在乾旱的季節，濕地儲存的水分會慢慢被釋出，流到鄰近的生境，調節當地水位，令其他植物得到滋潤，而動物亦能找到水源。此外，水生植物亦會吸取水分，增加濕地的儲水能力。濕地裏部份的水亦會滲透至地底，補充地下水源，便利農耕。

在雨季，持續降雨會令河流的水位上升及變得急湍或造成氾濫。有些濕地，例如湖泊和沼澤能夠儲存暴雨期間的降雨，舒緩河溪氾濫的壓力。此外，河溪的濕地植物亦會形成一道防線，減緩河水的流速，而且它們的根部能抓緊泥土，防止土壤被水流冲刷而流失，保護河堤。

阻隔廢物・潔淨水源

Natural filter for water cleansing

河水從上游流向下游的過程中，會不停冲刷河岸兩旁的土壤，令河水充斥大量的沙泥及懸浮物而變得混濁。但當河水流過水生植物叢生的濕地時，植物的枝幹會起物理性的阻隔作用，過濾大型的沙土及其他污染物，令河水變得清澈。



►蘆葦是其中一種具有有效過濾功能的濕地植物。Reed is one of the wetland plants that can serve as an effective natural filter.

氮、磷和鉀是植物成長的必要養分，但這些養分若超過一定的濃度時便會對環境造成污染，或引起藻類大量繁殖，急劇降低水中的溶氧量。濕地的水生植物會發揮過濾的功用，它們可吸取水中過多的養分或有機物，以及其他污染物，包括重金屬等有害物質。



►香港濕地公園的蘆葦床可以淨化水質，是綠色建築的好例子。The reedbed in Hong Kong Wetland Park purifies the water, and serves as a good example of green architecture.

When the water rushes down from upstream to downstream, it removes soil from riverbank, increasing the soil and suspended particles in water. However, when water flows through the aquatic plants, stems and roots of the plants act as a physical filter to trap the suspended particles and other pollutants to clean up the water.

Nitrogen, phosphorus and potassium are essential nutrients for plant growth. However, too much nutrients in water will cause pollution and trigger the rapid growth of algae. Aquatic plants growing in wetlands act like a filter, which uptake excessive nutrients and organic matters in water and remove pollutants including heavy metals.

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棲息生境・供應食糧

Home for animals, supply of food and resources



►濕地為動物提供庇護所。Wetlands are ideal nurseries for animals.

Wetlands are the cradle of many lives. They live in different types of wetlands and rely on them either in their entire or part of the life history. In tropical or subtropical areas, mangroves have developed complex root systems to adapt to the unstable inter-tidal environment. This provides ideal nurseries which attract many animals to live and breed in the mangrove swamp. Many predators are also attracted to forage there.

Human creates wetlands by pumping water into suitable places for agriculture. For instance, rice, taro and lotus are food crops commonly grown in wetlands. They encircle places for culturing fishes, or collect crustaceans or shellfishes in the inter-tidal areas for food. In addition, human collects wetland resources to make them as daily essentials or industrial raw materials. Many medicines are also extracted from wetland plants.



►人們於潮間帶捕捉甲殼類或貝類動物作食用。People collect crustaceans or shellfishes in inter-tidal areas for food.



►稻田為人工濕地的一種，為我們提供重要的糧食。Rice paddy is an artificial wetland, which provides us an important source of food.

濕地是很多生物的搖籃。牠們棲息於各種濕地之中，或於生命某一個階段完全依賴濕地生存。在熱帶或亞熱帶地區，紅樹為適應潮間帶不穩定的環境而發展出縱橫交錯的根，為動物提供庇護所，吸引牠們棲息繁衍，同時也吸引多種捕獵性的動物前來覓食。

人類會把水灌入合適的地方來製造濕地以作農耕之用，日常食用的稻米、芋頭、蓮花等便是在濕地中培植的農作物。人類還會圍地注水，形成人工魚塘來飼養水產；又或於潮間帶捕捉甲殼類和貝類動物作食用用途。此外，人類也會從濕地提取資源，作為日常生活或工業原料，另有很多藥物也是從濕地植物提煉而來。

地球碳庫・平衡循環

Earth's carbon storage to facilitate carbon cycling

濕地是地球上主要的碳儲存庫，並在不同的資源循環過程中擔當重要的角色。濕地植物吸收大氣中的二氧化碳，透過光合作用將之轉化成碳水化合物，大氣中的碳因而能夠進入食物網中，並被其他生物應用。根據濕地公約秘書處的資料，濕地的儲碳量，約佔全球陸地碳含量的三分之一，比森林吸收和儲存碳的能力高出近一倍。



►位於中國大陸四川、甘肅和青海交界位置的若爾蓋沼澤，有全球其中一個最大的高原泥炭沼。Ruergai marshes transborders the Sichuan, Gansu and Qinghai Provinces in Mainland China. It has one of the global largest peat bogs in high altitude.

某些溫帶的濕地（例如苔原、泥炭沼等）長期被水淹浸，營造出缺氧的環境，加上溫度低令表層植物被分解為有機物的速度緩慢，碳有機物得以累積，延緩碳在碳循環的過程中返回大氣層的速度。



►苔原是在永久凍土層上的濕地環境，低溫加上水分積聚，令表層植物分解為有機物的速度緩慢，碳有機物得以累積。Tundra is the wetlands on top of permanent frost subsoil. The cold temperature and water logging environment keeps decomposition rates low, this accumulates carbon in tundra soils.

Wetlands act as the major carbon reservoirs on Earth. They play an important role in the circulation of different resources. Plants in wetlands take up atmospheric carbon dioxide during photosynthesis and convert them into carbohydrates. In this way, atmospheric carbon dioxide will enter the food web and be consumed by other organisms. According to the Ramsar Secretariat, about one-third of the world's terrestrial carbon is trapped and stored in wetlands, double of that of forests.

Some wetlands in temperate region (e.g. tundra, peat bog, etc.) are waterlogged to be anaerobic. The cold temperature slows down the decomposition rate of surface vegetation to organic matters. All these cause the accumulation of organic carbon and reduce the rate of carbon returning to the atmosphere in the carbon cycle.

濕地物種受到威脅

Wetland species under threat

生物多樣性所指的不單是一個地區的物種總和，還包括當中的生態系統及基因多樣性。許多研究都發現濕地或依賴濕地的物種正在減少，當中包括水鳥、淡水魚、兩棲類動物、龜、鱷魚、珊瑚和依賴濕地生存的動物。

生物多樣性下降有許多不同的原因，包括生境消失、污染、氣候變化、過度耗用淡水資源、外來入侵種以及過度開發濕地等。現代人的生活模式已被證實會造成極大的生物多樣性損失。科學家相信在今個世紀，氣候變化將會成為導致濕地消失的主要原因。

氣候變化的出現，主要是由於人類活動大量排放二氧化碳及其他溫室氣體所致。

氣候變化令氣溫上升和海水水位上漲，這兩個現象均大大危害了濕地。例如珊瑚白化的機會會因海水水面溫度上升而增加；而海水水位上升會破壞海岸的生態系統，侵蝕海岸及淹沒沿岸的低地，致使許多海岸生物失去居所。



►有些紅樹林因為沿岸的住屋建造而被移除。The construction of residence at coastal areas results in the loss of mangroves.



►未被處理的污水流入河溪，會引致河溪的生物死亡。The inflow of untreated waste water to the river causes the death of living organisms inside.

瀕危的濕地物種的百分比（資料來源：濕地公約秘書處）
Percentage of threatened wetland species (Source: Ramsar Secretariat)

瀕危的濕地物種 Threatened wetland species	百分比 Global percentage (%)	備註 Remarks
水鳥 Waterbirds	17	統計為926種國際鳥盟所列出的水鳥 Regarding 926 waterbird species listed by BirdLife International
淡水魚 Freshwater fishes	33	不適用 Not applicable
兩棲類動物 Amphibians	26	統計所指的為淡水生境的兩棲類動物 Regarding the world's freshwater amphibians
龜 Turtles	72	統計所指的為90種淡水龜 Regarding 90 freshwater turtle species
鱷魚 Crocodiles	60	不適用 Not applicable
珊瑚 Corals	27	不適用 Not applicable
依賴濕地的哺乳動物 Wetland-dependent mammals	38	不適用 Not applicable

Biodiversity

is not only referred to the total number of species within a region, but also to the ecosystems and genetic diversity. Many findings reveal that the wetland or wetland-dependent species, including waterbirds, freshwater fishes, amphibians, turtles, crocodiles, corals, and wetland-dependent mammals are decreasing.

There are many different factors contributing to the loss of biodiversity. The causes include habitat loss, pollution, climate change, excessive withdrawal of freshwater, invasive species, overexploitation of wetlands etc. Modern living style has been proven to cause dramatic loss of biodiversity in this century. Scientists believed that climate change will become a key driver to the loss of biodiversity. The cause of climate change is mainly due to the emission of carbon dioxide and other greenhouse gases in large amount from human activities.

Climate change increases the atmospheric temperature and causes sea-level rise. These affect many types of wetland ecosystems. For example, coral bleaching increases with the sea surface temperature. The rise in sea level exerts adverse effects on coastal ecosystems, causing coastal erosion and inundation. This leads to a loss of habitats for coastal wildlife.



►珊瑚對氣溫上升是極為敏感的。Corals are extremely sensitive to the increased temperature.



►海水水位上升會破壞生態系統，侵蝕海岸及淹沒沿岸的低地，致使許多海岸生物失去居所。The rise in sea level exerts adverse impacts on coastal ecosystems, causing coastal erosion and inundation. This leads to loss of habitats for coastal wildlife.



►氣候變化會增加極端天氣出現的頻率，有些地區會有超級颶風，而另外一些地區則會變得非常乾旱。Climate change leads to the increased frequency of occurrence of extreme weather. Some areas will have severe storms, and some will have severe droughts.

濕地、生物多樣性與氣候變化，三者的關係密不可分。從今天起，就讓我們攜手保護濕地，應對氣候變化！

Wetlands, Biodiversity and Climate Change are closely related to one another. It is time for us to take action together against climate change. Start caring for wetlands and respond to climate change today!