Handout for Module 4 : Wetlands and Water

Introduction

Wetlands are part of our natural wealth and have been critical to the development and survival of human communities. The advancing technological skills of human communities may seem to have supplanted the role of Nature, but recent environment catastrophes - floods, landslides, storms, many with their roots in unsustainable land use practices - suggest otherwise.

Definition and types of wetlands, their importance and functions

a) The Ramsar Convention's definition of "Wetlands"

The Convention on Wetlands of International Importance or RAMSAR Convention defines wetlands as

"areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres" (Article 1.1).

The Convention text also stipulates that wetlands:

"may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands, especially where these have importance as waterfowl habitat." (Article 2.1).

b) Types of wetlands

- Inland wetlands (ie lakes, rivers, marshes)
- Coastal wetlands (ie mangroves, corals, seagrass beds)
- Human-made wetlands (ie rice paddies, fishponds, dams, reservoirs)

c) Status and Prospects of selected wetlands in the Philippines

The Philippines has 6 wetlands which are declared Ramsar sites.

- The Olango Island in Lapu-lapu, Cebu (5,820 hectares) is used by millions of shorebirds as a resting place enroute from Siberia and northern Japan to Southeast Asia and Australia. These migratory birds come to this waterfowl haven to escape the fierce winters in northern Asia. Each year, Olango sees nearly a hundred different species of birds, a number of which are migratory. Among the frequent guests are Chinese egrets, Asiatic dowitchers, Eastern curlews, plovers, and sandpipers.
- Naujan Lake National Park in Oriental Mindoro (14,568 ha) is the fifth largest lake in the Philippines (14km by 7km); it is volcanic in origin and receives water from local run-off with no major effluents. There are large areas of shallow water with an abundant

growth of aquatic vegetation. Most of the people in the area depend upon the lake for their livelihood, particularly through fishing.

- Agusan Marsh Wildlife Sanctuary (14,836 ha) includes a vast complex of freshwater marshes and water-courses with numerous shallow lakes and ponds in the upper basin of the Agusan River and its tributaries, which rise in the hills of eastern Mindanao. Some parts of the marsh have been converted into fish ponds and rice paddies. The site acts as storage for rain water and reduces the immediate downstream flow of flood water into Butuan City and other population centers.
- Tubbataha Reefs National Marine Park (33,200 ha), located in the middle of the Central Sulu Sea about 150 kilometers southeast of Puerto Princesa City, is well-known amongst fishermen in the southern Philippines and scuba divers around the world. Some 46 coral genera and more than 300 coral species have been recorded, as well as at least 40 families and 379 species of fish. Sea turtles, sharks, tuna, dolphins, and jackfish are also found in the reefs. The Park was inscribed in UNESCO's World Heritage list in 1993.
- Puerto Princesa Subterranean River National Park in Palawan (22,202 ha) is unique in the biogeographic region because it connects a range of important ecosystems from the mountain-to-the-sea, including a limestone karst landscape with a complex cave system, mangrove forests, lowland evergreen tropical rainforests, and freshwater swamps. It is home to about 800 plant and 233 animal species, including the critically endangered Philippine cockatoo (*Cacatua haematuropygia*) and Hawksbill turtle (*Eretmochelys imbricate*), as well as the endangered Green sea turtle (*Chelonia mydas*) and Nordmann's greenshank (*Tringa guttifer*).
- The Las Piñas-Parañaque Critical Habitat and Ecotourism Area (LPPCHEA) is a 175-hectare coastal urban wetland and bird sanctuary situated within the metropolis of Metro Manila, comprising two interconnected, mangrove-covered islands, shallow lagoons and coastline. A Presidential Proclamation in 2007 designated the site as a 'Critical Habitat' for the survival of threatened, restricted-range and congregatory species. At least 5,000 individuals of migratory and resident birds have been recorded at the site, including the vulnerable resident bird species Philippine Duck (*Anas luzonica*) which breeds at the site.

Other major wetlands in the Philippines are described in http://www.psdn.org.ph/wetlands/philwetlands.htm.

d) Ecosystem services provided by wetlands

- Provisioning services

  Wetland Products - Wetlands provide a variety of other benefits in the form of products that can be exploited for human use. The range is enormous: fruit, fish, shellfish, crocodile and other meats, timber for building, rice, fuelwood, fodder for animals, etc. Water is primarily sourced from wetlands. Exploitation is carried out in all levels - subsistence level, cottage industry, and the larger commercial scale - in all parts of the world.

- Regulating services

Flood Control - Wetlands often play a crucial role in flood control. Loss of floodplains to agriculture and human habitation has reduced this capacity. Construction of levees and dams on rivers to improve flood control have often had the reverse effect. Floodplain restoration and removal of structures in providing a partial solution in many countries.

Groundwater replenishment - An aquifer is a layer of rock containing water. Underground aquifers store 97% of the world's unfrozen freshwater, and they provide drinking water to almost a third of the world's population. Many wetlands help recharge these underground aquifers. Groundwater is the only source of water for many irrigation programs - 17% of the world's cropland is irrigated.

Water Purification - Plants and soil in wetlands play a significant role in purifying water. High levels of nutrients such as phosphorous and nitrogen, commonly associated with agricultural run-off, are effectively removed by wetlands. This is important in preventing eutrophication further downstream, a process that leads to rapid plant and algal growth followed by depleted oxygen levels that affect other species. It can also be important in preventing high concentrations of these nutrients reaching groundwater supplies or other water sources that may be used for drinking water

Sediment and nutrient transport - Wetlands tend to slow down the force of water, encouraging the deposition of sediments carried in the water. This is beneficial further downstream where deposition of sediments may block waterways. Nutrients are often associated with sediments and can be deposited at the same time. Nutrient retention in wetlands makes them among the most productive recorded, rivaling even intensive agricultural systems. Coastal deltas are dependent on riverine sediments and nutrients for their survival; engineered structures that interfere with the natural movement of sediments and nutrients can degrade deltas.

Shoreline stabilization/storm protection - Storm surges and other coastal weather disturbances can cause immense damage through flooding and direct destruction of property, not to mention the loss of human life. Mangroves, marshes, and other coastal wetlands act as the frontline defense against incoming storms. They help minimize the impact of storms by reducing wind action, wave action and currents, while the roots of the plants help to hold the sediment in place.

Climate Change Mitigation and Adaptation - Wetlands may store as much as 40% of global terrestrial carbon; peatlands and other forested wetlands are particularly important carbon sinks. Conversion to agricultural use and destruction of wetlands will release large quantities of carbon dioxide, the gas that accounts 60% of the global warming effect.

- Cultural services

Recreation and Tourism - Many wetlands are prime locations for tourism, and some these sites generate considerable income locally and nationally. Recreational activities such as fishing, hunting and boating, involve millions of people who spend money for these activities. Wetlands offer ideal locations for involving the general public and

schoolchildren in hands-on learning experiences, in an essentially recreational atmosphere, to raise awareness of environmental issues

Cultural Values - Although largely an unexplored, poorly documented subject, wetlands are frequently of religious, historical, archaeological or other cultural significance at the local or national level. In a preliminary survey of Ramsar sites, over 30% of a sample of 603 Ramsar sites recorded some archaeological, historical, religious mythological or cultural significance

d) Threats to wetlands

- Conversion of wetlands to other land/water uses (housing subdivisions)
- Reclamation, dredging and filling (commercial centers, shopping malls)
- Siltation and sedimentation (from deforestation and indiscriminate land-clearing)
- Pollution (from industry, households and poor agricultural practices)
- Introduction of Invasive Alien Species
- Loss of biodiversity
- Climate Change (coral bleaching, eutrophication, sea level rise, severe storms)

These threats are caused by human and natural actions such as drainage, dredging and stream channelization, damming, poor agricultural practices, introduction of alien invasive species, subsidence, drought, and severe storms, among others. These actions often result to siltation and sedimentation, release of toxic chemicals, air and water pollution, runoff, changing nutrient levels, subsidence, sea level rise and loss of biodiversity.

Major threats to marine ecosystems and resources include: 1) human-induced and direct stresses on species and ecosystems such as deforestation, expanding human settlements, water pollution, overfishing and the use of destructive fishing methods; 2) those that can be attributed to climate change such as coral bleaching, eutrophication, dredging, siltation and sedimentation, nutrient loading, and sea level rise.

One of the major driving forces behind the unprecedented loss of biodiversity on Earth can be attributed to climate change. This was made clear in the report on impacts, adaptation, and vulnerability to climate change of the International Panel on Climate Change. Species extinction rates increased by a factor of 1,000 over the last century, paving the way to the greatest wave of mass extinction of animal species in 65 million years. Unless action is taken now, two thirds of the Earth's remaining species are likely to be extinct by 2100. Thus, climate change clearly poses a major security to the very foundation of life on earth.

Climate change is likely to have a severe impact and compromise the wetlands ability to provide these benefits. Sea-level rise, coral bleaching, changes in hydrology and in the temperature of water bodies will lead to reduction in the goods and services provided by these wetlands. On the other hand, efforts to respond to climate change may have equally negative, and compounding, effects on freshwater and coastal zone ecosystems.

The goals of wetland conservation and wise use are unlikely to be achieved without taking climate change into account. It is generally understood and accepted that removing the existing

pressures on wetlands, and improving their resiliency is the most effective method of coping with the adverse effects of climate change.

Further, wetlands are known to play an important role in the global carbon cycle, and are a significant storehouse of carbon. When wetlands are converted, they emit large quantities of carbon dioxide and other greenhouse gases. Conserving, maintaining, or rehabilitating wetland ecosystems, therefore, can be a viable element to an overall climate change mitigation and adaptation strategy.

e) Some initiatives to conserve and manage wetlands

- The Ramsar Convention - The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. To date, the treaty has 169 Contracting Parties and 2,241 designated Ramsar Sites which are also called "wetlands of international importance" with a total surface area of 215, 247, 631 hectares. It is the only treaty that deals with a specific ecosystem. For more information about the Ramsar Convention, please visit www.ramsar.org.
- National Wetlands Action Plan for the Philippines (2011-2016) – The Philippines has no overarching policy on wetlands but it has come up with a National Wetlands Action Plan that serves as a guide for wetland advocates and workers. The first document was crafted in 1993 and later on was updated in 2011. Although the document is not officially endorsed yet by the DENR, many agencies and organizations refer to it to guide their work towards the wise use of wetlands. The full version of the NWAPP 2011-2016 can be downloaded from this link http://www.psdn.org.ph/wetlands/national_wetlands_action_plan.htm. The Action Plan is currently being updated again this year.

The link between wetlands, water security and disaster preparedness

All life on the planet depends on water. Water is critical for sustainable development and for human health and well-being. This recognition is not new - Leonardo da Vinci captured the importance of the issue when he proclaimed that 'Water is the driving force of all nature'.

The rise of the earliest great civilisations such as in the river valleys of the nile, Tigris-euphrates, Indus-Ganges and Yellow Rivers was dependent on the management of water and the benefits it provided. Yet human history is littered with examples of once thriving civilisations that are now no more than archaeological treasures buried in desert sands. In some cases the demise of these civilisations has resulted from a failure to manage water or to appreciate the delicate balance between wise use and exploitation. And human societies today continue to attempt to conquer and command water. However, water cannot be commanded.

As with the early great river civilisations, integrating the management of water, land and people remains a major challenge for the 21st century. Water is a critical natural resource upon which all socio-economic and environmental activities depend. International organizations such as the United Nations all highlight the importance of understanding the pressing need to resolve water management issues in an integrated, cooperative and holistic manner.

Water fundamentally connects. From source to sea and through the neverending water cycle, water connects all corners of planet earth. Wetlands occupy a key position in this interconnectivity and that the wise use of wetlands is essential for the delivery of sustainable water management.

The nexus of water, people and wetlands is at the core of water management. Wetlands constitute a resource of great socio-economic, cultural and scientific value, and their loss would be irreparable. Wetlands deliver essential ecosystem services, or the benefits people obtain from nature, including acting as regulators and providers of water. Thus water management and the "wise use of wetlands" are inextricably linked. It is important to raise people's awareness of the interdependence between water and wetlands, to highlight ways to ensure the equitable sharing of water between different stakeholder groups and to understand that without wetlands there will be no water.

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- Access to a clean and adequate supply of water is a basic requirement for human survival.
- Wetlands are fundamental regulators of water regimes.
- Without the appropriate management of wetlands there is no water of the right quality and quantity, where and when it is needed.
- Wetlands are the primary resource from which humans derive water and they are a major and critical component of the water cycle that keeps us supplied with water.
- We need to reconsider our view of wetlands within water management and recognise that the water resource requirements of human society are delivered by and through wetlands.
- We are all water managers, not just the water companies or government regulators. every time we turn on a tap or buy food we are responsible for a small element of the much larger water management cycle.
- Human society is responsible for the management of water and, de facto, the management of wetlands.
- Wetlands should not be viewed as competitors for water but rather as essential elements of water infrastructure within water management.
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- Sustainable water management is a key global concern - and a matter of life and death for a huge number of people.
- To deliver successful water management it is important to understand both direct and indirect water use from the perspectives of both consumers and producers of goods and products.
- By 2025, 1.8 billion people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could be under water stress conditions.

- Wetlands are the earth's natural water infrastructure, providing a clean source and store of freshwater. Their loss and degradation directly intensifies water supply issues and compromises human well-being.
- The role of wetlands in ensuring the security of water supply is also a matter of societal choice.

What can we do?

GLOBAL	REGIONAL	LOCAL
Local to national governments should recognise wetlands as the primary sources from which humans derive water and that they are a major and critical component of the water cycle that keeps us supplied with water. There are available materials that provide a substantial range of guidance on understanding how wetlands can be integrated into water management processes for the benefit of all elements of society. The key challenge is to ensure that these guidance is integrated into national and local policies and that the management of water across all social, economic and environmental activities is truly addressed.	Many river basin authorities and water agencies have insufficient appreciation of the socio-economic values and benefits provided by wetlands, such as the provision of fisheries, the regulation of flooding or their wider socio-economic importance. Successful water management remains an integrated, holistic and cooperative activity. The appropriate governance structures and integrated policies, including initiatives such as IWRM, need to be established to ensure that sound water management decisions are made which do not compromise the livelihoods and well-being of current and future generation	Managing water is the responsibility of all of us. Local actions to recycle, reuse and conserve water are the basis of sustainable water management and should not be underestimated. Local stakeholders have a direct role to play in the delivery of broader water management initiatives, through domestic initiatives such as rainwater harvesting and water-friendly garden design or simply reducing water usage or enhancing local wetlands. Similarly stakeholders are encouraged to ensure that their experiences and concerns are integrated into water management decision-making. The power to change through grass roots advocacy and ac

WATER MANAGEMENT STARTS AT HOME: WHAT CAN CONSUMERS DO?

Consumers can reduce the amount of water through direct action - by installing water saving toilets, applying a water-saving showerhead, shutting off the tap during teeth brushing, using less water in the garden, by not disposing of medicines, paints or other pollutants down the sink etc. They can also support the protection and restoration of wetland ecosystems.

But consumers also have an indirect water footprint and this is usually much larger than the direct one. To reduce their indirect water footprint consumers are faced with two basic options. The first option is to move from purchasing products with a large water footprint to an alternative product with a smaller water footprint. A second option is to continue with the same consumption pattern but to select a product that has a relatively low water footprint or that has

its footprint in an area that does not have high water scarcity. Such choices require access to information

It is important that consumers challenge manufacturers and ask for product transparency from businesses and governments alike. only when information is available on the impacts of products on the water cycle system will consumers be able to make conscious choices about what they buy.

http://www.waterfootprint. org/?page=files/YourWaterFootprint

Source: "Wetlands Take Care of Water", a leaflet for World Wetlands Day 2013 (Ramsar Convention)