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The Problems of Wetlands in Our Country and the Researches

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Abstract

The characteristics and current situation of China's wetlands are discussed, the reasons that cause environmental degradation of China's wetlands are analyzed in this article. The emphases of research on domestic wetlands are summarized from three aspects that function and benefit development of wetlands, construction of wetland reserves, restoration and reconstruction of wetlands, in addition, the development trend of future research on wetlands is prospected.

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Keywords: wetlands, the current situation of wetlands, researches on wetlands

1. Introduction

Wetland, forest and ocean are named three great ecosystems. With the functions of conserving water resource, purifying water quality, storing flood-water for use in a drought, regulating climate, protecting the coasts and others, wetlands also are the areas rich in biological diversity, the most dynamic ecosystems, which conserve many rare and endangered wild animals and plants. Wetland is called "kidney of the earth", natural reservoir and species bank. The sight and cultural value makes great contribution to the perpetuation and development of world civilization. Sound wetland ecosystem is the important component of national ecological security system and the foundation of realizing the sustainable development of economy and society. So it's the common duty of all Chinese and also of all humans to protect wetlands.

2. The Characteristics of China's wetlands

China's wetlands have the characteristics of multiple types, large absolute quantity, wide distribution, obvious regional variation and abundant biological diversity.

2.1. Multiple types.

According to the partition of wetland types in Ramsar Convention on Wetlands, 31 types of wetlands and 9 types of artificial wetlands exist in China. The main types of wetlands in China include natural

wetlands and artificial wetlands such as marsh wetlands, lake wetlands, river wetlands, estuary wetlands, coastal beaches, shallow waters along the coast, reservoirs, ponds, paddy fields and so on.

2.2. Large area.

China has the wetland area of about 65.94 million hectares, 10% of the wetlands over the world, the first in Asia and the fourth in the world. There are 38.4855 million hectares (paddy fields aren't included) of wetlands of over 100 hectares, in which, 5.9417 million hectares of seaside wetlands, 8.207 million of river wetlands, 8.3516 million of hectares of lake wetlands, 13.7003 million of marsh wetlands and 2.285 million hectares of reservoir and pond wetlands.

2.3. Wide distribution.

From cold temperate zone to tropical zone, from coastal areas to inland, from flatland to highland, there are wetlands in China with the characteristic of multiple wetlands in one region and one type of wetland in multiple regions, which forms the plentiful composite type.

2.4. Obvious regional variation.

There are lots of river wetlands in the east of China, marsh wetlands in the northeast, lake wetlands in the lower-middle reaches of Yangtze River and Qinghai-Tibet Plateau, salt water lakes and salt lakes in Qinghai-Tibet Plateau and northwestern arid regions, which forms the unique ecological environment.

2.5. Abundant biological diversity.

The types of wetlands environment in our country are various, there are 2276 species of advanced plants, 724 species of wild animals in wetlands, in which there are 271 species of palmipeds, 300 species of amphibians, 122 species of reptiles, 31 species of beasts, 1000 species of fish. So our country has the characteristic of abundant biological diversity, there are not only plenty of endangered, threatened and rare species but also many populations of great scientific research value and of important economic significance. One genetic material of the hybrid rice invented by our famous rice expert Yuan Longping comes from the wild rice of wetlands in Hainan province. According to Statistics, there are 57 species of engaged birds in Asia, of which 31 species in China's wetlands, account for 54%. There are 166 species of anatidaes in the world, of which 46 species in China's wetlands, account for 26%, and 15 species of cranes in the world, of which 9 species in China, account for 67%.

3. The Problem of Wetlands in China

3.1. Decrease of wetland area

Blindly reclaiming for agricultural lands, changing the use of wetlands and urban development occupying natural wetlands directly lead to natural wetlands' area decrease and function decline in China. Since founding of our country, the area of wetlands in Three Rivers Plain has decreased from 5.34 million hectares to 1.97 hectares in the past 50 years, the agriculture in Sungkiang Plain has been continually getting close to low flood lands, whose wetland area has decreased by over 70% compared with in the initial stages of the establishment of country, only 625 thousand hectares of wetlands left, 2.19 million hectares of coastal beach wetlands have been lost, which are equal to 50% of the coastal wetland area; 1.30 million hectares of lake areas are reclaimed all over the country, which exceeds the total area of five largest freshwater lakes.

3.2. *Serious environmental pollution in wetlands*

In our country, the influence of environmental pollution on wetlands is rapidly increasing with the process of industrialization. With the development of agriculture & industry and the expansion of urban construction, plenty of “three wastes” are directly discharged to wetlands, these harmful pollutants not only cause serious harm to biological diversity but also affect the environment of surface water, underground water and soil, making water quality worse, parasites epidemic, cause lack of water. At present, many wetlands have become the discharging area of agricultural & industrial waste water and domestic sewage. The pollution to rivers and lakes in our country is very serious, river length in IV class account for 12.2%, river length in V class account for 5.6%, and river length in inferior V class account for 17.5% among the 123 thousand kilometers of evaluated river length according to 2002 Water Resources of China.

3.3. *The damaged biological diversity in wetlands*

The deterioration of ecological environment in wetlands leads to change and damage of ecological environment of animals and plants in wetlands, which make more and more species, especially rare organisms, lose living space, endangered and even die out. There were 112 species of waterfowls and 5 subspecies in Hung Lake before 1970s, of which there were 15 species of rare birds in I and II class protection, 8 species of rare birds didn't emerge any longer after the 1970s, the species of fish decreased from more than 100 species in the 1940s to 50 species, the production of fish declined and fish became smaller, the species of aquatic vegetation decreased from 92 species in 1961 to 68 species in the 1980s, the quantity of aquatic vegetation organisms decreased by a wide margin. Qinghai Lake is the largest brackish water lake in our country, the deterioration of water ecological environment leads to sharp decline in fish resources, thus influences survival of fish and beasts. The fish species of lakes in Jiangnan Plain has decreased from 100 species 40 years ago to 50 species at present, for example, four main cultured fish, squaliobarbus curriculus, eels and others have been decreasing year by year, white-flag dolphins, Chinese sturgeons, paddlefish and cowfish have become endangered species and they are even faced with dying out.

4. **The Emphasis of Research on Wetlands**

Wetland has many functions and values, is one of the important environmental capital of humans, which is explained from three aspects that ecological benefit, economic benefit and social benefit in Plans of Wetland Activity in China. In addition, The functions of wetlands were defined as “all processes and their expression form occurring in wetlands” in International Geosphere-Biosphere Programme (IGBP) in 1996. And these functions were classified into 3 types: hydrologic function; biogeochemistry function; perching of organisms and maintenance of food cycle. The benefits brought to the society by wetlands can be summarized to the following aspects: (1) maintaining biological diversity, (2) adjusting and reserving flood; (3) avoiding natural disasters (4) degrading pollutants; (5) regulating climate; (6) preventing salt and alkali from going into coastal aquifers and waters; (7) habitats of wildlife; (8) offering abundant animal and plant products; (9) offering water resources; (10) offering mineral resources; (11) offering energy; (12) offer water transportation; (13) offering gene banks; (14) tourism and travel; (15) having Social and cultural significance; (16) value in education and scientific research; (17) maintaining natural system and existing processes.

4.1. *Construction of Wetland Reserves*

Protection of wetlands mainly depends on legislation and construction of natural reserves. With the support of international organizations such as Global Environment Facility, World Bank, World Wildlife Fund, Environmental Protection Agency of United Nations and others, our country has advocated a series of nationwide work to improve contractual capacity, drew up Plans of Protection Activity of Wetlands in China, founded China Project Office of Wetlands International, organized declaring international important

wetlands and so on. 553 wetland reserves with total area of 478 thousand square kilometers have been completed in our country by December of 2007.

4.2. Restoration and reconstruction of wetlands

Wetland restoration refers to restoration and reconstruction of retrograde or lost wetlands through biological and ecological technology or ecological engineering. Degradation of wetlands is the degradation and disappearing of wetland function because of change of wetland area and hydrologic condition, non-sustainable use of wetland resources, invasion of alien species and others. The present restoration practice of wetlands focuses mainly on the restoration of marshes, lakes, rivers, riverine wetlands and mangrove wetlands. The technologies and strategies of restoration and reconstruction of wetlands ecosystem degradation are different according to different wetland types and causes. In recent years, plenty of researches on eutrophication control and ecological restoration of shallow lakes such as Tai Lake, Dian Lake, Baiyang Lake and others have been done in our country, in which the relatively successful example is restoration of grass sea wetland in Weining, Guizhou. Because of difference of wetlands in function, type and region, the complete restoration of wetlands are not clear. Major researches are on flood storage capacity and function of waterfowl habitat, few researches are on water quality improvement and the function of underground water, and the more complex systematic hydrology and ecology are, the more difficult restoration will be.

5. The Development Trend of the Research on Wetlands

The researches on wetland in our country started in the 1950s, but rounded theoretical system hasn't formed so far, the researches on wetland ecosystem of different types are extremely uneven, it's suggested that the following researches should be reinforced except applying high and new technology, new progress will be made.

1. Reinforcing the basic theory research on wetland ecosystem. Further researches on scientific definition, quantitative classification indicators and grade unit system of wetlands are done on the basis of the types and characteristics of wetlands in our country. Mainly reinforce researches on the structure and function of wetland ecosystem, ecological process and mechanism of interaction, researches on the productivity, restoring ability and succession rules, researches on protection and sustainability of wetlands, researches on damage process of wetland ecology and its response system and researches on regional differentiation rules of wetlands.

2. Reinforce the research on applied technology in wetlands. The research is mainly on wetland protection technology, wetland restoration and reconstruction model, persistent utilization technology, management technology, the relation of wetlands and drought disasters.

3. Reinforce the research on the optimization mode of development and utilization of wetland resources. Guided by ecological economics, system ecology, biological engineering and others, study the optimization mode of development and utilization of wetland resources, give full play to the ecological, social and economic benefits of wetland resources on the basis of protecting wetlands.

4. Reinforce the research on wetlands in inland deserts combined with the development of the west regions. Wetlands play an irreplaceable role in maintaining regional ecological security, and the research on wetlands in inland deserts can greatly promote both wetland science development and regional development, which is of important significance to complete the strategy of developing the west.

5. Reinforce the research on the change rule of wetland environment influenced by human activities. The researches mainly include research on the response system of wetland ecosystem to human management and development, research on artificial mechanism for degradation and loss of overall function of wetland ecosystem as well as closely related social, historical and economic background etc.

6. Reinforce the research on evaluation indicator system of wetlands. Do research mainly on environmental impact evaluation of wetlands, ecological risk evaluation, wetland fragility assessment, benefit evaluation indicator system of wetland, safety evaluation of alien species introduction and so on.

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