STUDY ON THE SUSTAINABLE DEVELOPMENT OF WETLAND RESOURCES IN THE USSURI/WUSULI RIVER BASIN

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ABSTRACT: The Ussuri/Wusuli River basin joins the border between the Northeast region of Heilongjiang Province of China and the Far East region of Russia. The watershed consists of approximately 26 000 000 ha and the shared border stretches more than 1100 km. The Ussuri River forms part of the border between Russia and China. Two-thirds of the watershed ecosystem is in Russia, one-third in China. Khanka/Xingkai Lake is the border Lake of Russia and China, with the area of 4380 km². The Ussuri/Wusuli River Basin is rich in wetland resources, including surface water resources and wetlands. There are about more than 100 rivers belonging to one and two branch rivers, wetlands are mainly distributed in the Sanjiang Plain in China, which is the largest marsh area in China, with an area of 114 million ha. Human activities and agriculture reclamation for many years have led to many environment problems: 1) decreasing of wetland area led to loss of wetland environment functions, decreasing of biodiversity and increasing the number of natural disasters such as disastrous drought and waterlogging, which affect directly sustainable utilization of resources and economical development. 2) water supply is not evenly distributed, water pollution in rivers, marshes and lakes are more serious than before. Based on above study, some suggests of sustainable development in the basin have been made, which include: 1) developing the international wetland natural reserve and domestic comprehensive protected area to prevent wetlands from destruction and disturbance by human activities, 2) strengthening the protection and management of wetlands in lake shorelines and riparian zones (rivers and streams) to prevent water quality of rivers and lakes from pollution, 3) restoring the destroyed marsh in riparian zones and the "island-like forests" of wetlands 4) developing positively transnational ecological tourist trade to promote the economic development in the river basin scope, 5) developing international cooperation research to promote sustainable utilization and protection of wetland resources.

KEY WORDS: wetland resources; sustainable development; the Ussuri River; water resources

1 INTRODUCTION

The Ussuri/Wusuli River watershed is located in the southeast part of Heilongjiang Province of China, which joins remote regions of Russia. The watershed consists of approximately 26000 000 ha, which is about two-thirds of the watershed ecosystem in Russia, one-third in China. The Ussuri River forms part of the border between

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Russia and China, the shared border stretches more than 1100 km. Khanka/Xingkai Lake lies within both China and Russia. Its total area is 438 000 ha and about 108 000 ha belongs to China, which covers one-fourth of the total area.

The Chinese portion of the basin had a population of 4252 thousand, and the Russian portion had only 87 thousand, which covered one-fifth of the Chinese portion of the basin. Agriculture and coal mining are the main industries in the Chinese portion of the basin, and about 50 percent of the region is plain, which is mainly used for agriculture development, and becomes the state important region for grain production. The Russian portion, about 60 percent covered with forest, and only 10 percent used for agriculture, is mainly used for timber and mining development. The basin is rich in wetland resources, which includes surface water and marsh. So, wetland resources are the main factors for developing social economy. How to protect and rationally utilize these natural resources, keeping ecological balance of watershed, promoting resources and social economy with a harmony and sustainable development, is the key environment issues of the basin (Fig. 1).

2 MAIN PROBLEMS

Human activities for several decades of years, such as agriculture exploitation, forest cutting, had caused the wetland resources to face serious threat in the basin, which mainly contain the following aspects:

2.1 The Surface Water Is Not Sufficient, and the Water Supplies Are Not Unevenness in the Basin

2.1.1 Insufficient surface water in the basin

The Chinese portion of the Ussuri basin has a temperate, humid and semi-humid continental monsoon climate. Annual rainfall totals approximately 500 – 700 mm, varying substantially in time and place. The Russian portion of the Ussuri region lies between two climatic zones: the oceanic monsoon and the moderate continental. Annual precipitation varies from northeast to southeast, ranging from 600 – 700 mm in the central Sikhote-Alin to 800 mm near the coast.

There are more than 100 rivers in the basin, and there are more rivers in mountainous areas than in plain areas. Most rivers in plain areas are marsh rivers, which have no water in low water period and plenty water in rich water period. The characteristics of these rivers are that river channel gradient is small, with great curving, and wider river flat. The Ussuri River, as one of the important international rivers, and as the border river between China and Russia, is about 4780 km long. Its width is about 300 – 1000 m, and channel gradient is about 1/16 000 – 1/48 000. Annual even runoff depths vary from place to place. There are also a big lake and a small Xingkai lake, and 10 middle-sized and large reservoirs, and a great number of pools in the basin. The big Xingkai Lake, as the international border lake, has an area of 22 400 km², its deepest point is about 10 meters.

Wetlands have a great deal of surface water in the basin. It was identified that the volume of water in wetlands of the Sanjing Plain in China had 34.83 × 10⁸ m³, which is a valuable surface water resource in the region. These resources have special eco-environmental functions, which had played a great role in maintaining regional water balance, and ad-