

Restoration of Rhine River - 2 (Netherlands)

The scenery of Rhine River in Netherlands has dramatically changed by centuries of human activities such as creating banks that decreased anti-flood fields; agricultural use of anti-flood fields; river course improvement for transportation; and massive wastes disposal. It resulted in deterioration of Rhine River's environment. In 1970s, the aquatic life in the river was contaminated by harmful chemicals, and the river was called "sewage in Europe." Especially after 1986's chemical factory fire in Sandos, Switzerland, the water quality was deteriorated. People grew conscious on environment, and created "Rhine River activity plan" targeting at "salmon living river by 2000." By the end of 1980s, thanks to the efforts by the surrounding local governments, the environment was recovered to a level to be quoted as a hygienic excellence.

◆ Key to Restoration

- Water quality improvement
- River form restoration
- Free fish inhabitation and relocation, habitat variety improvement

◆ Overview of the River

Through centuries, bank raising and standardization of topographic profile were conducted with Rhine River, which contributed to improving anti-flood features and transportation. But its water quality was badly deteriorated to an extent to be called the sewage in Europe. After 1986's chemical factory fire in Sandos, Switzerland, the water quality was deteriorated. It urged the full-scale measures by an international committee, a water contamination was improved by ninety percent by 1994, and salmon has returned to the river.



◆ Project Efforts for Restoration

[Water quality improvement]

The first stage in 1980s targeted at decreasing water contamination source. Removal of phosphorus, heavy metal, and minute environment contamination source, as well as increasing of dissolved oxygen (DO) amount, were conducted. As a result, the environment has recovered an aquatic life-inhabitable state. People can safely swim in the river.

[River form restoration]

Multiple projects were started in this decade. Limited to Netherlands, a new project has improved the environment of 4000-ha anti-flood field along Rhine River. Such projects create lakes in sub-courses and in the anti-flood fields, raise the height of anti-flood fields, and remove banks.

[Free fish inhabitation and relocation, habitat variety improvement]

In order to assure free move for the fish going to and from upstream or downstream, it was decided to equip fish passes with all the inland dams (three) and the dam at the mouth of the North Sea.



Rhine River in Netherlands

Source: National Land Technology Policy Research Institute document "Toward human-nature symbiotic basin for urban restoration -- people, water, land, and environment --" Katsuhide Yoshikawa

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"River restoration in Netherlands: water problem's framework guidelines and future prospect in Europe"