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# ACTUAL ENVIRONMENTAL PROBLEMS

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Refer to the technical means of water quality management at home and abroad; use the concept of maximum daily load (TMDL) to govern the river water environment in Zhangjiakou City, Hebei Province; use total phosphorus as a representative indicator of river eutrophication as a water quality evaluation factor; sort out the drainage network, Current status of discharge and non-point source pollution; use Zhangjiakou river environment

model coupling calculation method; scientifically formulate total phosphorus emission control plan; simulation calculation.

*Keywords:* water environment governance; total maximum daily load; water quality evaluation index; rivers in Zhangjiakou City, Hebei Province.

**Main urban water system:** The rivers in Zhangjiakou City belong to three basins, namely: inland river basin, Luan he river basin and Hai he river basin. There are mainly five water systems, namely: inland river system, Luan River system, Yong ding River system, Chao bai River system and Daqing River system.

The purpose of the study is to use the concept of maximum daily load (TMDL) to control the river water environment in Zhangjiakou City, Hebei Province. Based on the construction and application of the TMDL model system, fully considering meeting the needs of residents' life and recreation, according to site conditions investigation, determine the plots and control rates in the drainage area where the source low-impact development measures can be implemented, and determine the source control plan. Construct a drainage network system and couple it with the two-dimensional surface to form a drainage model. Determine the specific location, waterlogging situation and waterlogging risk analysis of the waterlogging area in the region, and formulate a process gray pipe network restoration project plan. It mainly solves the problem of non-point source pollution of rainwater discharged into the river in the urban area of Zhangjiakou.

**Source governance:** 1) Roof runoff control

*Rain down tube disconnection.* Most of the rain downpipes in the old community are old and damaged, and many places are connected to the balcony sewage. During the renovation, the old rain down pipes will be connected to the sewage pipe network, and the newly built rain down pipes will be disconnected and drained to biological retention facilities such as transmission-type grass ditch and rain water garden for infiltration and purification treatment. According to different site characteristics and rainwater control requirements, the combination of disconnection measures and rainwater treatment facilities can adopt different forms.

*Green roof.* Set up green roofs in roof areas where conditions permit, and build roof rainwater collection and infiltration systems. In the water system organization form of green roof (square)-rainwater garden-rainwater storage pond-river course, rainwater is purified and then penetrated to ensure the water quality of supplementary groundwater sources and reduce the load of soil removal of pollutants.

*Surface runoff control.* Sponge facilities are set up on the green space and paving around the building to mainly treat the roadway, roof and own rainwater. Roof rainwater is introduced into the rainwater garden through rain downpipes. By adding small rainwater storage facilities, the rainwater is collected and stored at the same time for water replenishment and water exchange, as well as nearby greening and road sprinkling.

**Remediation effect:** (1) Social benefits

The renovation of Zhangjiakou's urban area has improved the living environment of residents, and improved the green landscape between buildings through greening and sketches; parking spaces have been increased and standardized to make parking more convenient for residents. At the same time, the waterlogging area and time of waterlogging at the intersection and the east area of Xing cun have been greatly reduced, reducing the risk of waterlogging in the urban area of Zhangjiakou and reducing the loss caused by urban waterlogging.

(2) Ecological benefits

On the basis of rain and sewage diversion, Zhangjiakou District has adopted various measures including LID and initial rainwater storage tanks to achieve urban non-point source pollution control. According to the volumetric method, the runoff pollution control rate of urban water is 82.68 %, which meets the target requirements and plays a better role in protecting downstream water quality.

Therefore, through the TMDL method and roof runoff control, green roof, surface runoff control. The area and time of waterlogging at the intersection of Xing cun Village and the East District have been greatly reduced, the risk of waterlogging in the urban area of Zhangjiakou has been reduced, and the loss caused by urban waterlogging has been reduced. The urban water runoff pollution control rate was 82.68 %, which met the target requirements and played a good role in protecting downstream water quality.

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### SECTION 3

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