Index System Research on Environmental Impact Assessment of Ecological Project in Xishui River

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Abstarct. The problems were analyzed about the environmental impact in the construction projects of water conservancy in China. Some relevant data and relevant guidelines were combined with the actual work which were referred to several environmental impact assessment reports. An index system was proposed about environmental impact assessment of ecological improvement project in Xishui River.

Keywords: Index system; Environmental quality; Environmental assessment.

1 Introduction

As an important part of water conservancy projects, river comprehensive management has always been valued by governments. River harnessing should not only meet the requirements of water conservancy and drainage, but also consider the requirements of comprehensive management such as the ecological environment protection of the project[1].

In 1969, the United States first proposed the concept and system of environmental impact assessment, and required that all water conservancy projects be subject to environmental impact assessment [2]. In 1984, China completed the "Water Environmental Impact Assessment Standards." At present, China's water conservancy projects have carried out different degrees of environmental impact assessment[3].

However, at present, the methodology for comprehensive evaluation of environmental impact assessment of water conservancy projects has not yet been established. Based on the environmental impact assessment method, this article closely combines with the actual project of the Xishui River Ecological Comprehensive Improvement Project, conducts research from many aspects of environmental impact assessment, and finally makes suggestions for the environmental impact assessment system.

2 Index structure

Based on the analysis of the EIA report, the EIA approval and the EIA expert opinions, and combined with the existing index system to form a preliminary indicator system. Then seek expert advice and get a indicator system.

Table 2.1 Structure of Engineering Analysis Indicators.

First-level indicators	Secondary indicators	Third-level indicators
Engineering Analysis	Legal planning compliance	Policy compliance
		Comprehensive planning coordination
	Reasonable location selection	Reasonable layout of the project
		Reasonable site layout
	Construction Environmental Impact Analysis	Construction Wastewater Analysis
		Construction waste analysis
		Construction noise analysis
		Construction Solid Waste Analysis

Supported by Open Project From Key Laboratory for Geographical Process Analysis and Simulation of Hubei Province.
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Table 2.2 Status of Investigation Index Structure of Environmental Quality.

First-level indicators	Secondary indicators	Third-level indicators
Environmental Quality Survey	Regional natural environment	Regional natural environment
	Water Environment Quality Status Monitoring	Pollution Source Investigation
		Surface water quality
	Ecological Environment Status Survey	The status of terrestrial ecology
		Aquatic Ecology Status
	Air quality status monitoring	Environmental air quality status
	Acoustic quality monitoring	Acoustic environment quality

Table 2.3 Environmental Impact Prediction and Analysis Index Structure Table.

First-level indicators	Secondary indicators	Third-level indicators
Environmental Impact Prediction	Water impact prediction	Water environment change forecast
	Ecological environmental impact forecast	Terrestrial ecological impact prediction
		Aquatic ecological impact prediction

Table 2.4 Main environmental protection measures indicators structure table.

First-level indicators	Secondary indicators	Third-level indicators
Major Environmental Protection Measures	Water environmental protection measures	During construction
		During operation period
	Ecological environmental protection measures	Terrestrial ecological
		Aquatic ecological
	Atmospheric protection measures	Air pollution control measures
	Environmental protection measures	Noise prevention measures
	Solid waste prevention measures	Solid waste control measures

3 Case study

3.1 Engineering analysis

3.1.1 Legal planning compliance

This project is subject to the encouragement of the "Industrial Structure Adjustment Guidance Catalogue (2011 edition)" (2013 Revision).

3.1.2 Rationality of site selection

This project compares the topography, geology, flooding loss and ecological damage of the two dams. According to the survey, its a reasonable choice.

3.2 Survey of environmental quality

3.2.1 Survey of surface water quality

The table shows the results of surface water quality inspection in the project area.

Table 3.2-1 List of surface water environmental quality (unit: mg/L, pH dimensionless).

Time	Section	Monitoring Project					
Standard		pH	Permanganate index	SS	NH_3-N	Total phosphorus	Petro
Class III		6～9	6	70	1.0	0.2	0.05
28-Nov	1#	7.36	4.1	5	0.771	0.15	0.03
	Standard Index	0.56	0.65	0.75	0.771	0.23	0.8
	2#	7.19	5.42	7	0.868	0.15	0.02
	Standard Index	0.905	0.903	0.95	0.868	0.75	0.8
	3#	7.56	4.88	9	0.924	0.08	0.03
	Standard Index	0.72	0.813	0.951	0.924	0.4	0.8

29-Nov	1#	7.61	3.2	6	0.677	0.07	0.03
	Standard Index	0.695	0.567	0.951	0.677	0.35	0.8
	2#	7.47	5.60	10	0.816	0.13	0.03
	Standard Index	0.765	0.833	0.975	0.816	0.65	0.8
	3#	7.32	4.4	15	0.955	0.09	0.04
	Standard Index	0.77	0.72	0.975	0.955	0.45	0.8

From the table, it can be seen that the water quality index of the Xishui River can meet the requirements of the Class III standard in Environmental Quality Standards for Surface Water (GB3838-2002).

3.2.2 Survey of air quality

Table 3.2-2 Air status assessment results

Numbering	Monitoring points	Project	Pollutants	Concentration range (mg/m³)	Standard value (mg/m³)	Maximum concentration of standard (%)	Standard conditions
1#	Xishui Runde Experimental School	Hourly average range	SO_2	0.015～0.064	0.5	6.60	Qualified
			NO_2	0.019～0.138	0.2	18.10	Qualified
		Daily average range	SO_2	0.016～0.032	0.15	14.70	Qualified
			NO_2	0.017～0.024	0.08	28.75	Qualified
			PM_{10}	0.071～0.076	0.15	51	Qualified
2#	Confucian Temple	Hourly average range	SO_2	0.019～0.025	0.5	7.29	Qualified
			NO_2	0.020～0.029	0.2	15	Qualified
		Daily average range	SO_2	0.016～0.025	0.15	15.66	Qualified
			NO_2	0.020～0.023	0.08	27.75	Qualified
			PM_{10}	0.053～0.065	0.15	48	Qualified
3#	Railway Bridge	Hourly average range	SO_2	0.017～0.028	0.5	8.16	Qualified
			NO_2	0.017～0.027	0.2	14	Qualified
		Daily average range	SO_2	0.018～0.022	0.15	13.67	Qualified
			NO_2	0.020～0.023	0.08	27.50	Qualified
			PM_{10}	0.072～0.078	0.15	49	Qualified

The air quality indicators of SO_2, NO_2, and PM_{10} at each sensitive point meet the requirements of Class II standard of the Ambient Air Quality Standard (GB3095-2012).

3.2.3 Survey of ecological environment

The vegetation in the project area mainly belongs to the evergreen broad-leaved forest. Due to the long-term economic activities of human beings, the main types of land are farmland and bushes. There are no national protected animals in the range.

The main water in the assessment area is the Xishui River, and the fish are mainly common species.

3.3 Environmental impact prediction

3.3.1 Prediction of water impact

The waste water mainly comes from the construction machinery and vehicle cleaning, it has a small impact on the surrounding environment.

3.3.2 Prediction of ambient air impact

The power source for transport vehicles and work machines is diesel, and the main pollutants produced are CO, THC, and NO_X. Due to its small amount of production, limited discharge time, it makes less impact on the surrounding environment. Finally, these effects will disappear with the completion of the project.

3.3.3 Prediction of acoustic impact

The impact of this project on the acoustic is limited to the construction period. The noise equivalent sound pressure level of engineering equipment is about 77-90dB (A).

3.3.4 Prediction of ecological environment

The impact of the project on the waters is mainly the suspended solids generated by river dredging during construction and the domestic sewage discharge of

construction workers. If the domestic sewage of the construction workers is included in the existing domestic sewage treatment system, the ecological environment of the waters will not be affected.

During the construction period of this project, bare openings will be formed, which will damage the vegetation and cause damage to the ecological environment. Besides, construction workers and traffic activities will interfere with the ecological environment in the surrounding areas, we need to provide drainage ditch outside the excavation area and temporary road to prevent the surface runoff from scouring the site.

3.4 Major environmental protection measures

1) Covering the construction area, covering the temporary soil, and greening the exposed land.

2) Monitoring the atmosphere, water quality, noise, etc.

3) Add chemical agents to reduce the amount of pollutants in the water, and use it for surrounding greening after treatment.

4 Conclusion

Based on the research, some prospects for the environmental impact assessment of future water conservancy projects will be made:

1) Constructing an Environmental Impact Assessment Index Information System.

2) Improve the technical guidelines for environmental impact assessment.

3) Conduct post-evaluation of environmental impact of water conservancy and hydropower projects.

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