



The Game of Engineering Ethics in Gully Water Conservancy Reconstruction Project of Xishuangbanna International Tourism Resort

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Abstract: With the rapid development of our country's economy and urban construction, the number of new construction and reconstruction projects of water conservancy projects has gradually increased. In the construction process, there are also engineering ethics problems that cannot be ignored, among which safety, responsibility, ecological environment and benefit compensation and other related problems are relatively significant. Based on the basic principles of engineering ethics and aiming at the practical problems in the gully water conservancy reconstruction project of Xishuangbanna International Tourism Resort, this paper makes a comparative study of pros and cons, and points out that the concepts of “deontology”, “contract theory” and “virtue theory” should be adhered to in the water conservancy project. While focusing on maximizing social benefits, it is more important to ensure “the greatest happiness of the greatest number of people”. And put forward the corresponding measures to solve the problem. At the same time, because there are many special situations in the types and actual construction of water conservancy renovation projects, this study needs to further analyze multiple practice cases and summarize the common content of such projects, so as to effectively guide the construction of similar water conservancy renovation projects and provide references for future research on ethical issues of water conservancy renovation projects, so that water conservancy projects can benefit mankind more effectively.

Keywords: Water Conservancy Project, Engineering Ethics, Gully, Xishuangbanna International Tourism Resort

1. Introduction

Xishuangbanna International Resort is a comprehensive cultural tourism project developed by Wanda Group, located in Jinghong City, Xishuangbanna Prefecture, covering an area of 5.3 square kilometers. Gully is located in the middle of Xishuangbanna International Resort, from Qingquan Road in the south to the intersection of Coconut Grove Road and Xincheng East Road in the north. The north-south length is about 1.6 kilometers, the height difference is about 5 meters, and the east-west width is about 190 meters and the narrowest is about 90 meters. The total area is 155,000 square meters, including about 40,000 square meters of water surface (Figure 1). In 2022, the hedge ditch is proposed to be upgraded, and the overall requirements are: to treat the silt at the bottom of the river and conduct anti-seepage treatment;

Increase water quality monitoring and purification systems; Set up a dam to facilitate water storage during drought; Afforestation on both sides of the gully is reformed to preserve the old trees and rainforests and form a waterfront landscape integrating greenery and water surface. The total cost is 45 million yuan, the unit price of hard transformation is 330 yuan per square meter, and the unit price of green is 240 yuan/square meter; Water conservancy design standard is “once in 20 years”; Shenzhen Municipal Government is responsible for the completion of the safety of anti-seepage, anti-leakage, flood control design. Xishuangbanna International Tourism Resort Development Co., LTD., Wanhai Marketing Department, Group cost Department and other departments have approved the channel transformation

program. The project is near the Dai Show theater and landscape houses in the east, and the high-end residential area in the west. The current water conservancy facilities are relatively simple, and there are no leisure facilities in the site, which has become an “unrepaired patch” in the site. Improving the quality of water conservancy projects and the waterfront environment has become an important part of the construction of the resort. However, the reconstruction involves the demolition of local residents, downstream flooding problems, ecological environment destruction and later maintenance problems. Although the development company is actively promoting the project, some citizens are opposed to it, while others are neutral. Therefore, it is necessary to analyze the inherent problems, feasibility and construction plan of the project from the perspective of engineering ethics in order to maximize the interests of all parties.



Figure 1. Current location map of gully.

2. Purpose and Significance of the Study

2.1. Research Purpose

This study analyzes various ethical problems existing in gully water conservancy reconstruction projects from the perspectives of safety, responsibility, ecological environment and benefit compensation, aiming to solve the problems of weak awareness of safety and responsibility, weak ecological ethics and fair compensation for the parties with damaged interests in the projects, enrich the ethical research of water conservancy projects and promote the development of water conservancy projects in a benign direction. The project

proposes the following two specific purposes:

- (1) Theoretical purpose. Based on the case system of Gully, this project makes an in-depth analysis of the problems of engineering safety, responsibility, ecology and benefit compensation, and solves the problems of safety risk, lack of responsibility, destruction of ecological environment and injustice and equality of benefits compensation for migrants in water conservancy projects, which can provide systematic ethical reference for the study of such water conservancy projects.
- (2) Application purpose. This study compares the ethical problems existing in water conservancy projects from the perspective of positive and negative project values, technical basis and ethical standpoint, and proposes to coordinate the relationship between safety responsibility and morality, economic interests and ecological benefits of water conservancy projects, hoping to provide guidance for the government and other supervisory bodies to formulate management norms and policies for water conservancy projects.

2.2. Research Significance

- (1) Theoretical significance. From the perspective of engineering ethics, this study deeply analyzes the ethical issues such as safety, responsibility, ecological environment and benefit compensation in water conservancy projects, which helps to improve the theoretical system of water conservancy engineering ethics, enrich the theoretical research of water conservancy engineering ethics, and provide theoretical basis for water conservancy project participants to solve ethical problems.
- (2) Practical significance. This study can warn the phenomenon of violation of engineering ethics in water conservancy construction projects, and provide some practical reference for the construction management and subsequent operation of water conservancy projects.

3. Relevant Domestic and International Research

3.1. Relevant International Research

The book *Man and Nature* discusses the issue of ecological environmental protection from the perspective of ethics [1]. As water projects in the Amazon basin in Brazil cause greenhouse gas emissions, attention should be paid to the importance of environmental impact assessment [2]. Huizen took the Libi Dam project as an example to discuss the development concept of environmentalism from the perspective of environmental ethics and engineering ethics [3]. Scientists should not only consider the issue of interests, but also bear the responsibility for the social impact brought by the practice of science and engineering, and the ethics

caused by the application of social technology [4]. Germany introduced the “ethics of technology” to evaluate the aspects of ethical responsibility and technology [5], and a new ethics of technology is needed to explain the various ethical issues brought by the constantly developing technology [6]. In 1991, VID Guide 3780, brought the purpose, meaning, ethics, responsibilities, and values of engineering into the vision of engineers [5]. The former Soviet Union studied engineering ethics from the perspective of professional ethics construction [5], pointing out that engineering ethics is concerned with issues such as the relationship between engineers and social workers and the responsibilities of engineering personnel [7], and engineers should not only possess superb professional skills, but also be organizers of production activities and educators who care for workers [5].

3.2. Relevant Domestic Research

- (1) Research on safety ethics of water conservancy projects. Safety problems such as lack of risk concept and non-standard identification of safety monitoring system may occur at various stages of the whole life cycle of water conservancy projects, so it is necessary to establish a safety monitoring mechanism to strengthen supervision of safety review, process, quality inspection, project acceptance and system identification [8]. The main reasons for the safety accidents in the construction of the Yellow River Water Conservancy project are as follows: the standard of dike construction, the regional nature of the project, the fluidity, the variability, the unsafe factors on the construction site, and the safety management problems [9]. There are some problems in the management of water conservancy projects, such as inadequate identification of hazard sources on site, inadequate safety supervision force, and lack of safety emergency system [10]. The safety of water conservancy projects involves a scope far beyond the buildings and structures themselves [11].
- (2) Research on the responsibility ethics of water conservancy projects. Most engineering accidents are caused by the indifference or lack of responsibility consciousness of engineering activity subjects, so the system of behavioral ethics norms for engineering subjects should be improved [12]. The institutional ethical mechanism is used to regulate the collective action of engineering community and the ethical responsibility mechanism is used to track the collective action of engineering community [13]. The environmental legal responsibilities of water conservancy and environmental protection administrative agencies, project construction parties and citizens should be clearly defined [14]. The view of “engineering is a social experiment” holds that informed consent, shared responsibility, equity and sustainable development are the principles and norms of responsibility ethics [15].
- (3) Research on ecological ethics of water conservancy projects. Water conservancy projects have negative ecological effects on rivers, terrestrial organisms and social environment, and the natural desire of human beings without boundaries reflects the dislocation of human ecological value [16]. The concept of ecological ethics should be established based on constraint, compensation and evaluation [17]. After the construction of the Three Gorges water Conservancy Project, changes in water environment, soil environment, climate and biodiversity have been affected [18], and biodiversity has been seriously threatened, which reflects human's disregard for animal rights. It is necessary to rethink animal rights and pay attention to the equal relationship between human and nature [19]. It has changed the flow conditions of the upper and lower reaches of the Yangtze River, causing many other problems: landslides, migration, the relationship between rivers and lakes in the middle and lower reaches of the Yangtze River, bank collapse caused by clear water erosion, and changes in the living environment of aquatic animals and fish [20]. In the construction of the canal and road, Hongqi Canal adhered to the ecological principle of less land area and no tree destruction. In the project, canals were opened around the mountain, tunnels were cut, shafts were dug, and canals were crossed in three layers, reasonably avoiding villages, cultivated land and houses, which highlighted the simple ecological consciousness aiming at minimizing environmental damage [21].
- (4) Research on compensation ethics of water conservancy projects. The construction of water conservancy and hydropower projects is easy to cause secondary poverty of migrants, and it is necessary to guarantee the right of public participation and implement a long-term compensation mechanism [22]. The ambiguity of compensation standards and the delay in issuing them have an important impact on social justice [23]. Taking the flood control project of the lower Yellow River as an example, it is pointed out that the establishment of institutions, function allocation, fund management and formulation of measures in the fund management of land expropriation compensation and resettlement of water resources projects should be effectively managed [24]. The investment compensation method can protect the rights and interests of immigrants while taking into account the interests of the government and project owners [25].

3.3. Research Review

There are more empirical studies on the ethics of hydraulic engineering in foreign countries, but less theoretical studies. In China, we focus on the responsibility of water conservancy projects, the destruction of ecological environment and the justice of compensation for the benefits of immigrants. The above research results can be used for

reference in this research. However, there are some shortcomings in the research of water conservancy project ethics: first, the responsibility, ecology, safety and benefit compensation in water conservancy projects and the reasons behind the lack of in-depth research; Second, rarely from the perspective of different stakeholders of water conservancy projects, the analysis of opposition comparison. These are the directions that this paper tries to study.

4. Relevant Principles of Hydraulic Engineering Ethics

4.1. Utilitarianism

Utilitarianism holds that whether the behavior and norm conform to morality mainly depends on the effect to be achieved. Action utilitarianism indicates that the maximization of the whole utility should be considered when constructing hydraulic engineering ethics, while rule utilitarianism points out that the absoluteness of rules should be emphasized when constructing hydraulic engineering ethics. Therefore, the ethics of water conservancy projects should not only consider the possible consequences of individual behavior and pay attention to the maximization of social benefits, but also pay attention to the construction and compliance with the corresponding ethics and norms of water conservancy projects to achieve the result of “the greatest happiness of the greatest number of people”. Utilitarians believe that utility not only refers to the interests of individuals, but also the overall welfare of society. However, in reality, many interest subjects rationalize extreme egoism, which makes utilitarianism produce great utilitarian color. Therefore, water conservancy projects should avoid the extreme egoistic goal, and the goal can not only complete the project, nor can it only profit for individuals or some people, to meet the interests of some people, but should as far as possible to meet the greatest interests of most people, to bring welfare to the whole society.

4.2. Deontology

In water conservancy project, the implementers of the project are not only the enjoyment of rights, but also the undertakers of responsibilities and obligations. This kind of responsibility not only shows that the behavior is restricted by the judiciary and rights and bear the legal obligation, but also shows that the project stakeholders should bear their own inherent ethical responsibility as an absolute command. Therefore, on the one hand, it is necessary to pay attention to the moral responsibility and obligation of engineering personnel, so that the moral responsibility of engineering personnel becomes a general consensus, and can regulate and modify the behavior according to their own obligations and responsibilities; On the other hand, engineers should have the

sense of “good”, follow the self-evident obligation, and internalize it into the sense of responsibility. Ross's deontology holds that engineering participants should grasp the self-disclosure and consciousness of duty, and engineering personnel should have a clear cognition of themselves and engineering responsibilities, and clarify the legitimate behavior of duty through their moral goodness. In addition, the right and wrong behaviors of engineering personnel and actual engineering obligations in different stages of the project will vary according to different engineering conditions, so the actual engineering obligations should be used as the basis to guide the actual engineering behaviors.

4.3. Contract Theory

The principles of contract theory should be applied to the ethics of water conservancy projects to establish an idealized consensus on the ethics of water conservancy projects, and the ethical standards in engineering behaviors should be obtained to guide and restrict the behaviors of project participants. The ethics of water conservancy projects should emphasize democracy and equality, and equal consideration should be given to the objects involved in the project: engineering personnel, construction personnel, social groups whose behavior benefits or harms, society and even the whole natural ecosystem. Therefore, under the premise of ensuring fairness for everyone, the project is characterized, the ethics of water conservancy projects are developed according to the conventional ethical principles, and the moral rules are observed on the basis of citizens' consensus and consensus.

4.4. Virtue Theory

Moral ethics holds that moral behavior comes from the moral qualities of virtuous people, and this kind of virtue should judge its good and evil according to the long-term behavior trend, rather than only from a certain behavior. Under the influence of moral ethics, the ethics of water conservancy projects began to emphasize the moral sense of engineering personnel from the perspective of moral norms, and all participants in water conservancy projects should uphold good moral qualities. Water conservancy projects should be evaluated according to the individual character of the actors, rather than just looking at the rules and results. On the whole, We can't just talk about the advantages of water conservancy projects. The virtues of water conservancy projects exist in the whole process of water conservancy projects. Therefore, we must take power, fame, money and other benefits as external accessories, combined with the theory of virtue and concrete practice, to construct ethical concepts suitable for contemporary water conservancy projects.

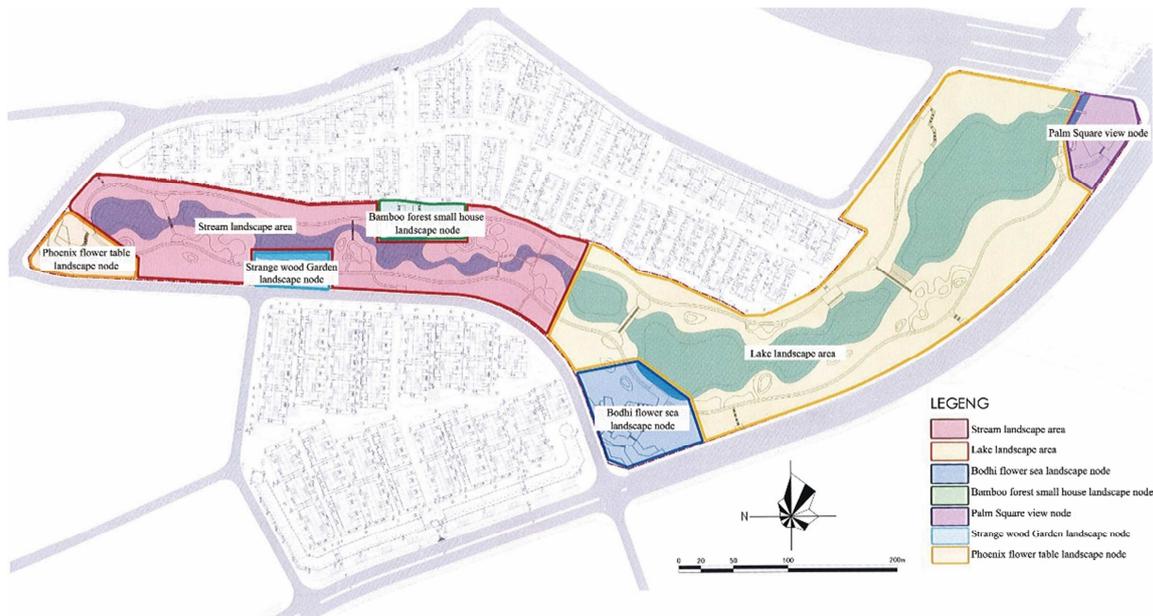


Figure 2. Gully functional zoning map.

5. Positive and Negative Perspectives of the Project

5.1. Positive Perspectives

- (1) Improving regional economic benefits. The development company believes that the water quality of the optimized trench will be greatly improved, various leisure functions will be increased, and the beautification of the back waterfront environment will attract more tourists to vacation tourism (Figure 2, Figure 3, Figure 4), increase various consumption, and attract more buyers to buy houses, which will bring huge economic benefits.
- (2) Increase employment opportunities. On the one hand,

the transformation of the gully needs a lot of construction personnel, which can increase the employment opportunities of the labor force in the short term; On the other hand, different functional areas are set up in the site, and a large number of staff are required for later operation management and maintenance.

- (3) Drive industrial development. The construction process requires the use of a large number of construction materials and construction facilities, which can drive the development of water conservancy, construction, landscape and other related industries.
- (4) Improving the ecological environment. Built into an ecological wetland park, it can purify water, improve air quality, produce oxygen, and regulate the temperature and humidity of the surrounding environment.

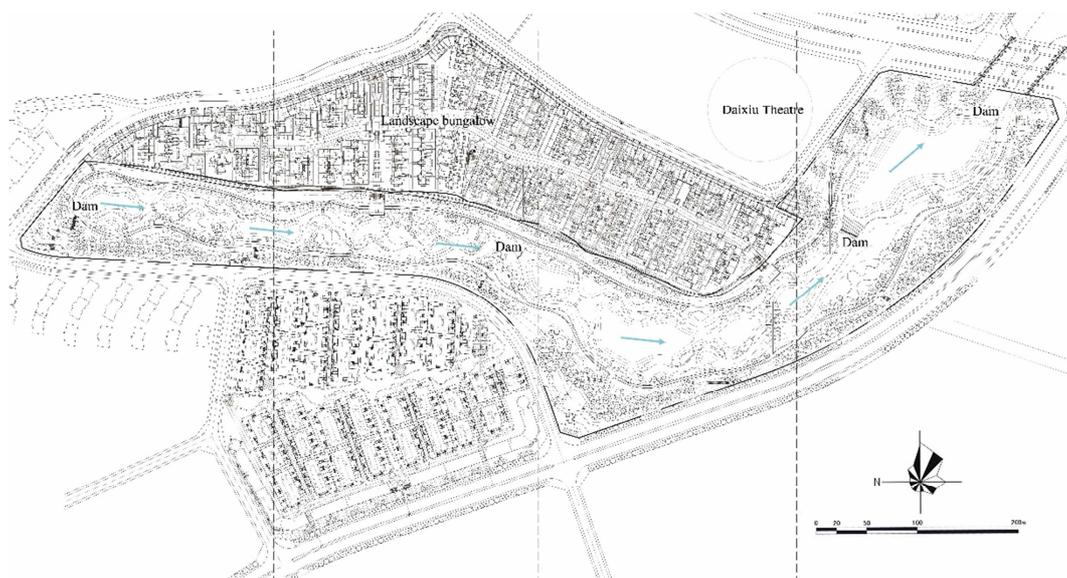


Figure 3. Gully water conservancy construction drawing.



Figure 4. Gully water conservancy engineering rendering.

5.2. Negative Perspectives

- (1) Negative impact on the surrounding ecological environment. On the one hand, the construction process will cause water pollution, air pollution, sound pollution and so on; On the other hand, it is easy to cause soil erosion, change of microclimate, change of animal habitat and breeding habits, and destroy the established balance between living things and nature. In the later period of drought, the impingement of the dam will lead to no water in the lower reaches and destroy the ecological environment in the lower reaches.
- (2) The construction of gully renovation project will cause safety problems. Firstly, during the construction process, the dam will be pumped to the downstream area, resulting in unforeseen safety hazards; Secondly, accidents of collapse and soil subsidence are easy to occur in the construction process, which threatens the safety of construction personnel. At the same time, the destruction of the original ecosystem will cause ecological security problems.
- (3) The unfair problem of benefit compensation. On the one hand, the project needs to occupy part of the residential area in the river; On the other hand, after the completion of the river dam, it involves the demolition and resettlement of downstream immigrants, and there will be unfair and unfair compensation for the benefits of immigrants.

6. Game Analysis of Positive and Negative Viewpoints

6.1. Engineering Value of Positive and Negative Viewpoints

6.1.1. Engineering Value of Positive View

- (1) Gully is surrounded by Xishuangbanna Dai Show Theater, large shopping malls, high-end residential areas, schools, hospitals, hotels and other supporting facilities, which can not only attract tourists to vacation, but also increase the sales of residential buildings and bring huge economic benefits.
- (2) Leisure value. The original trench is only an ordinary grass slope, water landscape, lack of beautiful and leisure facilities, no one to play here. Through the renovation, facilities such as waterfront walk, water walking, waterside forest belt, aquatic plants and viewing pavilion can be added to attract people to come here for leisure activities.
- (3) Ecological value. The project will carry out a new underwater anti-seepage treatment, water quality monitoring, purification treatment, planting a large area of plants, can purify the air, reduce pollution.
- (4) Flood control value. This project takes into account the "once in 20 years" warning line of Gully flood disaster, which can reduce the flood disaster that the surrounding and downstream areas may face.
- (5) Security value. The construction unit is a regular

first-level construction unit, with strong technical force, high personnel quality, production standards, strict supervision, strong execution and high guarantee.

- (6) Responsibility value. Set up a layer of reporting, level by level management system, the development company headquarters will also be from time to time on-site inspection, supervision of the relevant units should fulfill their obligations and responsibilities to complete the situation.

6.1.2. Engineering Value of Negative View

- (1) Economic value. The project investment is huge, but also involves the relocation compensation problem, the cost recovery period is long, can't guarantee the direct and indirect economic benefits and investment offset in the short term, while changing the lifestyle and structure of the original residents, will produce secondary poverty problems, resulting in irreparable losses.
- (2) Leisure value. The site needs long-term maintenance and good operation to maintain long-term leisure value, and the newly planted plants need many years of growth to form a beautiful leisure space.
- (3) Ecological value. Before construction, it is necessary to set up a dam to deal with the water at the bottom of the river, which is to hedge the destruction of the original animal and plant ecosystem of the ditch. In the later stage, in order to ensure the water landscape, four dams were set up (Figure 3), which would have ecological impacts on both upstream and downstream. At the same time, the artificial water ecosystem is more fragile and needs more money to maintain.
- (4) Flood control value. General water conservancy projects consider that the flood level is "once in 50 years", and the "once in 20 years" flood level design will cause the surrounding and downstream areas to encounter flood disasters.
- (5) Security value. Most of the construction personnel of the construction unit are local farmers, and the general quality and ability are not high, and the sense of safety and responsibility is not strong, which is easy to cause security risks.
- (6) Responsibility value. Local relevant units will be due to certain interests, there will be the problem of mutual deniability, there will be mutual internal collusion, the phenomenon of concealment, headquarters in Beijing, unable to truly and real-time management of the implementation and quality of on-site tasks.

6.2. Technical Basis of Positive and Negative Viewpoints

6.2.1. Technical Basis of Positive View

- (1) The construction party has the first-level water conservancy project construction general contracting qualification and the first-level landscaping project construction qualification, has completed a number of national and provincial large-scale engineering construction projects, accumulated a lot of mature

construction experience, and is sure to complete the construction task efficiently, safely and quickly.

- (2) In view of the ecological problems that may be encountered in the construction of the project, the construction side has found effective solutions through the construction of the Menga Reservoir project in Xishuangbanna, such as transplanting the original ancient trees and rain forest plants, transferring the protozoa in the area in advance, and then adding animals and plants in the later stage.
- (3) Regarding flood control, construction shall be carried out in strict accordance with maps and standards in accordance with relevant water conservancy documents of the local government and the state.
- (4) For the resettlement and other problems faced by the project, the successful experience of the water body reconstruction of Xishuangbanna theme Park can be used for reference. We will jointly negotiate and mediate the immigration issue with the government.

6.2.2. Technical Basis of Negative View

- (1) Water conservancy reconstruction will pump the original water in the site to the downstream area to re-regulate the river bottom. At the same time, due to the construction, the waterfront area needs to be re-covered or excavated, resulting in the original aquatic animals and plants in the water and surrounding areas cannot survive, and the downstream organisms will also face floods. Although the existing water conservancy engineering transformation technology is relatively mature, it can not realize the complete protection of wild animals and plants, and will lead to the extinction of some species.
- (2) Xishuangbanna is located at the northern edge of the tropics. Ailao Mountain and Wuliang Mountain in the north block the southbound cold current. In the south, both sides are close to the Indian Ocean and the Bay of Bengal. In summer, it is affected by the southwest monsoon of the Indian Ocean and the southeast air flow of the Pacific Ocean, resulting in a hot and rainy climate. Therefore, the flood control measures of "once in 20 years" have great hidden dangers, and should be adjusted to "once in 50 years" in order to protect the life safety of surrounding and downstream residents and reduce unnecessary losses.
- (3) While realizing the huge economic benefits and industrial development mentioned in the square, the construction of the project will bring flood disaster risks to the downstream residents, and bring greater security risks to the people in other regions while benefiting the region.
- (4) The project planning is not the best or necessary, there are other alternatives, which can be mainly repaired, increase flood control treatment and residents' leisure facilities on the basis of the original water system, revetments and embankments, and add or transplant some plants, so as to avoid various risks brought by the

project and reduce the damage to the original ecological environment.

6.3. Ethical Position of Positive and Negative Views

6.3.1. Ethical Position of Positive View

The positive view follows the core of “people-oriented”, and ensures the sustainability of the project by negotiating with the government on immigration issues, transferring and supplementing plants and animals, increasing supervision and other measures; At the same time, according to the positive point of view can achieve huge economic benefits, benefit one side, is the perfect interpretation of the “utilitarian” position, can effectively promote the development of tourism and construction industry in Xishuangbanna. However, this view ignores the constraint and guiding role of “deontology”, “contract theory” and “virtue theory” on the project, and fails to take into account the reasonable demands and rights of vulnerable groups such as local and downstream residents. The project should not only obtain economic benefits without considering the security threats to the surrounding and downstream areas and the safety of construction personnel; The interests of some should not be realized at the expense of the interests of others; Moreover, we should not neglect the life and health of human beings and the lives of all kinds of organisms for short-term benefits, which will threaten the safety of the entire ecological environment. Therefore, we should uphold the concept of “putting people first, respecting human rights and respecting life”, and use existing knowledge and skills for the benefit of mankind on the basis of ensuring the safety of individual lives, property and ecosystems.

6.3.2. Ethical Position of Negative View

The opposing view fully adheres to the principle of “deontology” and embodies the spirit of “contract” and “virtue”. In order to maintain the normal construction order and ecological balance of the project, it lays a solid foundation for ensuring that the project achieves the expected goal. However, this view also overemphasizes the moral content of deontology in engineering, and holds that engineers should clarify the “legitimacy” of obligations from their own moral “goodness”. The “contract theory” Angle overconsiders the fairness of all the objects involved in the project; From the “virtue theory” too much emphasis on the morality and moral sense of engineering personnel, ignoring the rules and final results of the project, so that the project is easy to cause social disputes, resulting in the concrete implementation of the project by many obstacles, affecting the progress of construction.

7. Conclusions and Suggestions

7.1. Conclusion

Under the rapid development of urban construction, water conservancy projects are becoming more and more, water conservancy engineering has become an important component of our country's economic development. In order

to meet people's demand for optimizing water resources and improving the quality of the waterfront environment, redevelopment, optimization and upgrading of the original water conservancy projects have become an inevitable choice everywhere. However, they tend to pay more attention to the maximization of utility, while ignoring other ethical dimensions. In the construction of water conservancy reconstruction projects, we should adhere to the principle of “deontology”, pay attention to the application of the concept of “contract theory” and “virtue theory”, pay attention to the maximization of social benefits, and pay attention to the application of the code of conduct in line with the “greatest happiness of the greatest number of people”. Adhere to the safety principle and strictly prevent the safety risks and sudden risks in the construction process; Adhere to the principle of responsibility and strengthen the awareness of responsibility of engineers, engineering enterprises and the public; Adhere to the principle of combining environmental protection with water conservancy project construction, and establish a comprehensive environmental impact assessment and ecological compensation mechanism; Adhere to the principle of fairness and difference to complete the benefit compensation of immigrants; Follow the principle of justice, perfect the compensation procedure of water conservancy project; The government and public opinion should jointly supervise the compensation fund.

7.2. Suggestions

Based on the ethical principles and the opinions of many scholars and experts to solve the ethical problems of hydraulic engineering, this paper puts forward some countermeasures to solve the similar ethical problems of hydraulic engineering.

7.2.1. Strictly Eliminate Potential Safety Hazards in Water Conservancy Project Construction

There are many hidden dangers in water conservancy projects, which will not only cause huge economic losses, but also cause casualties. Therefore, we should strengthen the sensitivity to risks, always prevent the safety problems caused by water conservancy projects, pay attention to the prevention of construction risks and sudden risks in downstream areas.

7.2.2. Promote the Establishment of a Sense of Responsibility for Water Conservancy Project Construction

With the construction of a large number of water conservancy projects, the negative effects of water conservancy projects are becoming more and more obvious, which has aroused widespread concern in society. We need to reflect on the reasons behind the aggravation of hydraulic engineering problems. Nowadays, the rapid development of science and technology makes the subject of technical responsibility lack, especially in the increasingly complex water conservancy project construction, enterprises, engineers and the public should be actively guided to

establish their own sense of responsibility and promote the initiative to assume responsibility.

7.2.3. Promote the Coupling Development of Water Conservancy Project Construction and Environmental Protection

In water conservancy projects, in addition to giving full play to the economic benefits of water conservancy projects, it is also necessary to establish a correct ecological consciousness, create a benign environmental impact assessment mechanism to promote the sustainable development of the ecological environment, construct and implement an ecological compensation mechanism and a fair compensation system, realize the coordinated development of the ecological environment and water conservancy construction, and promote the virtuous cycle of ecological resources.

8. Peroration

With the development of social economy in our country, water conservancy engineering construction is also changing. Under the new situation, higher and higher requirements are put forward for water conservancy engineering, and new ethical issues will constantly be generated, arousing extensive social attention [26]. Therefore, when studying the ethics of water conservancy projects, we should constantly optimize our own ethical theoretical system, constantly surpass and integrate the theories and principles of engineering ethics, and constantly explore solutions to new ethical problems, so as to promote the construction of water conservancy projects to benefit mankind more effectively.

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References

- [1] P. M. George, *Man and Nature: Or, Physical Geography as Modified by Human Action*. New York: Scribner, 1864.
- [2] P. M. Fearnside, *Forests or fields?: A response to the theory that tropical forest conservation poses a threat to the poor*. *Land Use Policy*, 1993, 10 (2), pp. 108-121.
- [3] P. V. Huizen, *From a “Whopper” to a “Green and Clean” development: Modernity, environmentalism, and the Canadian-American Libby Dam Project*. Vancouver: The University of British Columbia, 2007.
- [4] Laboratory of Dialectics of Nature, Institute of Philosophy, Chinese Academy of Social Sciences, *Foreign Problems in Natural Science Philosophy*. Beijing: China Social Sciences Press, 1991.
- [5] S. X. Li, *Introduction to Engineering Ethics*. Beijing: China Social Sciences Press, 2008.
- [6] M. L. Qi, *Establishing applied ethics of science and technology*. *Social Sciences Abroad*, 2000 (03), pp. 64.
- [7] D. J. N. Du, X. K. Wang, *Engineering Ethics*. *Abstracts of Modern Foreign Philosophy and Social Sciences*, 1984 (3), pp. 24.
- [8] X. Wang, Q. W. Zheng, Z. Y. Zhang, Z. R. Zhang, C. Li, *Current situation and improvement strategy of Water Conservancy project safety monitoring in China at the stage of high-quality development*. *Water Resources and Hydropower Express*, 2023, 44 (03), pp. 76-83+88.
- [9] L. Liu, *Discussion on measures to keep the safe production situation in the construction of the Yellow River Water Conservancy Project sustainable and good*. *Yellow River*, 2022, 44 (S2), pp. 242-243.
- [10] Q. Sun, *Safety problems and improvement strategies in hydraulic engineering management*. *Engineering Construction and Design*, 2022 (23), pp. 263-265.
- [11] D. X. Li, *Analysis on the core content of water conservancy project ethics*. *Water Conservancy Development Research*, 2020, 20 (01), pp. 26-31+35.
- [12] L. T. Zeng, *Research on Engineering Risk and its Prevention from the perspective of Responsibility Ethics*. Kunming: Kunming University of Science and Technology, 2016.
- [13] W. Chen, *Research on Ethics of collective action of Engineering community*. Nanjing: Southeast University, 2017.
- [14] G. L. Yin, *Construction of water conservancy project responsibility on the basis of environmental protection*. *Law and Society Law and Society*, 2019 (36), pp. 217-218.
- [15] X. X. Ye, *Research on Social Experimentation of Engineering and its Responsibility Ethics*. Nanjing: Southeast University, 2020.
- [16] W. Y. Xin, *The impact of hydropower projects on ecological environment and its philosophical reflections*. Tianjin: Tianjin University, 2012.
- [17] H. Y. Liu, A. G. Liu, *Construction of ecological ethics in hydraulic engineering construction*. *Rural Economy and Science and Technology*, 2014, 25 (12), pp. 64-65+61.
- [18] Y. Zhou, *Ecological ethics of large-scale water conservancy projects: A case study of the Three Gorges Project*. *Modern Commerce and Industry*, 2017 (24), pp. 136-137.
- [19] S. L. Huang, *Thinking on ecological ethics of large-scale water conservancy projects*. *Economic and Trade Practice*, 2017 (16), pp. 291-292.
- [20] J. Li, J. J. Huo, N. F. Chao, G. Chen., *Environmental problems in hydraulic engineering from the perspective of engineering ethic*. 2019 (23), pp. 192-193.

- [21] X. N. Yue, Study on Ecological value of Red Flag Canal Project. Zhengzhou: Zhongyuan University of Technology, 2019.
- [22] Y. N. Luo, Research on ethical Issues in Water conservancy and hydropower engineering. *Communications of Dialectics of Nature*, 2014, 36 (2), pp. 71-74+104+127.
- [23] L. Zhang, Research on ethical problems and countermeasures of hydropower project construction from the perspective of engineering ethics. Wuhan: Wuhan University of Technology, 2014.
- [24] Z. X. Wang, X. M. Li, Research on supervision and management of land compensation and resettlement funds for water conservancy projects: A case study of flood control projects in the lower Yellow River. *Fiscal Supervision*, 2022 (10), pp. 78-81.
- [25] X. Li, Research on compensation scheme of migrant investment in water conservancy project. *Guangxi Water Resources and Hydropower*, 2022 (2), pp. 104-105+111.
- [26] R. Deng, Dujiangyan and Hydraulic engineering ethics. *Journal of North China Institute of Water Resources and Hydropower (Social Science Edition)*, 2010, 26 (4), pp. 108-113.