**Annual Project Progress Report**

[Research Project of Urban Water-saving Strategies and Ways of Water Replenish]

[Date of report]



**Basic Project Information**

|  |  |
| --- | --- |
| **Project Title:** | |
| UNDP Award ID |  |
| UNDP Project ID |  |
| CRIS Contract Number |  |
| Project Duration | 2011.11-2013.12 |
| Reporting Period |  |
| Total Approved Project Budget | 400,000 dollars |
| Participating UN agencies |  |
| Implementing Partners/  National collaborating agencies | The China Science Center of International Eurasian Academy of Sciences  Beijing Quanhuitongda Technological Services Co., Ltd. |
| International collaborating agencies |  |
| Cost-sharing third parties |  |
| UNDP Contact officer |  |
| Project website |  |

**Executive Summary**

Based on the analysis of the status of China's urban water conservation as well as the legal system, major problems existing in urban water conservation pathway and urban water conservation strategies are identified. To meet the shortfall, the definition of “water replenish” is proposed and the theory framework is developed in this project. As an important way of urban water conservation, there are lots of uncertainty in water replenish area and object. According to this theory, the water replenish projects can be implanted by direct ways or indirect way, and the behaviour is non-mandatory. Furthermore, the accounting model for water replenish, water quality replenish, and soil and water conservation replenish are established. The replenish level is divided into four levels, including overflow replenishment, fully replenishment, partially replenishment and zero replenishment. In order to supply an useful and efficient tool for water replenish accounting, the urban water replenish accounting software, integrating the function of project management, water accounting of the amount of replenishment and water replenishment level evaluation is also developed in this study. As a typical case, the accounting software is used in Jinan Iron and Steel Group to evaluate the projects has launched in the past five years and the eastern sewage treatment centre of Jinan Iron and Steel Group is identified as the possible cooperation project.

In addition, the potential of water conservation and water replenish in China's beverage industry is analyzed. According to estimates, the beverage industry will need replenish 625 million m3 / year water (according to water supply amount) and 160 million m3 / year water(according to water consumption amount) in the "Twelfth Five-Year" to achieve a fully replenishment level. On the basis of it and the analysis of the water using features of China's industrial sectors, the water replenish theory is considered to have a broad application prospect in the fields of beverage industry, wine industry and manufacturing industry of chemical materials and products; meanwhile, the application background and ways for water replenish in various industries as well as the potential areas applied for water replenish are analyzed briefly with the expectation to play a certain role in guiding the launching of the water replenish in future.

**1. Background**

**Development Context**

China is a country with a relative shortage of water resources, under the stresses of water shortage and water pollution, and facing the risk of water crisis. Domestic and international experiences show that water saving and pollution reducing are the fundamental ways to ease the water crisis. As early as 2001, the strategy suggestion of “top priority given to water saving, emphasis on pollution control, multiple development of water resources” has been proposed by Chinese scholar. In 2011, the strategy of “top priority given to water saving” is taken as one of China’s five general plans for water control according to the NO.1 Document of the Chinese Central Government and the central water conservancy work conference held recently, and further expression “advocate and strengthen water saving greatly, improve the water use efficiency and benefit constantly” is also proposed. Thus, the study on strategies of water saving and exploration of effective ways of water replenish cooperating with international organization have a great significance under this new situation.

**Project Objectives and Strategy**

The project's overall objective is: to raise public awareness of water saving and promote the implementation of national strategy of "top priority given to water saving" by deepening the study of urban water saving strategies and exploring effective ways of water replenish. Specific objectives include:

——Around the national strategy of "top priority given to water saving" proposed recently, study and propose suitable urban water-saving strategies, explore effective ways of water replenish and put forward corresponding suggestions and countermeasures.

——Research to establish measurement methods of water-saving amount for different water saving ways, explore the relationship between water-saving amount and water replenish amount, and develop software for assistant accounting of water saving and water replenish.

——Raise public awareness of water saving by discussion, communication and advocacy of the philosophy, techniques and methods of urban water saving and water replenish.

More than 20 units participate in this project in different ways and different degree. This project has provided theoretical support and accounting tools support for water replenish projects and will be helpful to improve China's urban water conservation strategies.

**2. Key Results**

**Project Outcomes**

**Outcome 1： Establish the theoretical frame of water replenish.** The lack of the water replenish theory system is the most important factor that restricts spreading the water replenish idea and launching water replenish projects, so this project focuses on completing the system. Water replenish is defined as “the process of offsetting or slowing down the deterioration of water quality of the water environment, water reduction or soil erosion, etc. that are caused by water intaking, water using or drainage in the production or for living through the implementation of additional engineering measures and non-structural measures by those who use water”, believing the water replenish owning the characteristics like the certainty of the compensation scope, the uncertainty of the compensated objects, the non-mandatory of the compensation behaviour and the diversity of the compensating means, and the water replenish levels are divided into these four levels--- the overflow replenish, complete replenish, partial replenish and zero replenish.



Figure: Generalization of water replenish

**Outcome 2： Approaches of identifying the water replenish.** The water replenish approaches determine the executive mode of water replenish project. There are two water replenish approaches, including the direct way and indirect way. The direct way is to compensate for the water used in the production, water quality and soil erosion through engineering measures, such as water storage, sewage collection and treatment, water system improvement and diversion irrigation by those who conduct the water replenish; while the indirect way is that those who use water support others to implement the projects related to the water replenish by providing capital, technology, intellect and other elements, and those who conduct the water replenish may be involved in project planning and design, but not directly involved in the implementation and management of the specific projects, only giving advisory and consultancy on the project.

**Outcome 3： Establish water replenish calculation models and develop calculation tools**. Calculation of the water replenish amount is an important basis for assessing water replenish effect. According to the definition of the water replenish, the amount of water replenish can be calculated from three aspects-- the amount of water, water quality and soil conservation, and the related calculation methods have been established by summarizing and combing. On the basis of it, the calculating software of water replenish amount is developed coupling the management of the integrated project, the calculation of water replenish amount, the level evaluation of the water replenish and other functions. At present, the copyright of the software is under the application.

**Outcome 4： Take Jinan Iron & Steel Group Corporation as an example to demonstrate the application of the water replenish project calculation.** Take Jinan as a typical city and Jinan Iron & Steel Group Corporation as a typical enterprise for demonstration, the calculation of the project concerning water replenish conducted from 2007 to 2012 in Jinan Iron & Steel Group Corporation shows that the total water replenish in Jinan Iron & Steel Group Corporation is 181.44 million m3, which belongs to overflow replenish level. Meanwhile, the research group initially determined the sewage treatment centre on the east of Jinan Iron & Steel Group Corporation as the next possible cooperation project according to the research.

 **Outcome 5： Analyze the water saving and water replenish potentials of the beverage industry in China**. To calculate the water replenish potentials of the beverage industry on the basis of the amount of water intaking of per litre of beverage products of all kinds of beverages and the estimate of various beverages production during the “Twelfth Five-Year Plan" period. According to the calculation, the water needed to compensate for will be 625 million m3 / year and 160 million m3 / year in accordance with the evaluations conducted with the amount of water intaking and water using respectively if the complete compensation is achieved. On the basis of it and the analysis of the water using features of China's industrial sectors, the water replenish theory is considered to have a broad application prospect in the fields of beverage industry, wine industry and manufacturing industry of chemical materials and products; meanwhile, the application background and ways for water replenish in various industries as well as the potential areas applied for water replenish are analyzed briefly with the expectation to play a certain role in guiding the launching of the water replenish in future.

**Outcome 6：Pilot tested.** To set up the wastewater treatment facilities.

**Activities and Outputs**

**1.1 Collect statistical information on urban water saving, comprehend China's urban water policies and water saving status, analyze urban water-saving ways and water-saving potential.**

As to the total water saving amount, the water amount saved from 1991 to 2020 in the whole cities of China through a variety of water saving measures reaches 69.86 billion m3, 37.5% more than the urban water consumption (50.79 billion m3) in 2010. In 2008, the water saving amount in all cities of China is up to 6.59 billion m3, accounting for 13.2% of the urban water consumption of the year. And in 2010, the water saving amount in cities is 4.07 billion m3。

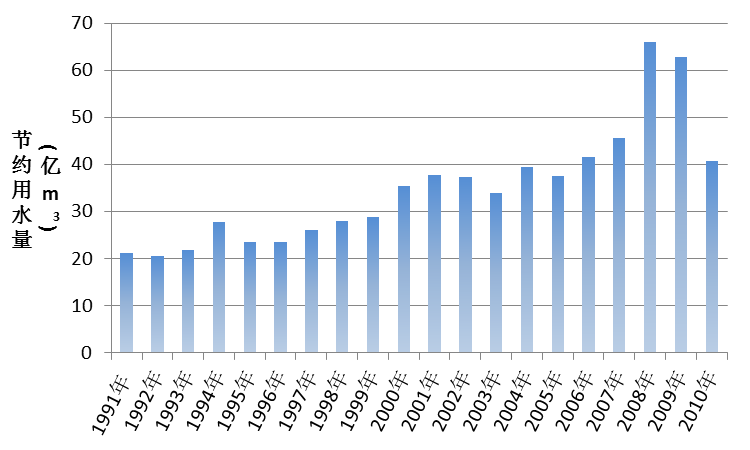


Figure: Urban water saving amount in China (1991-2010)

Statistical information on urban water saving from 1991 to 2010 are collected. Then, the urban water saving ways and the main problems are identified based on the analysis of process of improving the legal system of urban water saving in China since its foundation.

**1.2 Choose typical water-saving cities and carry out investigation and research to get an understanding of typical cities water-saving situation, sum up advanced water-saving technologies and experience.**

As of 2011, the total of 5 batches of 57 cities is in the naming of the National Water Saving Cities. On that basis, choose six cities including Beijing, Jinan, Shenyang, Yangzhou, Guiyang and Urumchi as typical cities to carry out field investigation and research to understand the urban water saving situation, and identify the drive of urban water saving, and thus summarize the their water saving technology and experience from the aspects of water saving policies and regulations, water saving planning, water price leverage, the water quota management, pipe network leakage and seepage control, scientific and technological support, unconventional use of water resources and water saving publicity, etc.

12 symposiums are held in these 6 cities and more than 300 experts,r managers or publics present these symposiums, with women representatives accounting for 45% and the age between 30 to 40 accounting for 60%.

**1.3 Review the historical evolution of China's urban water strategy, study and propose urban water-saving strategies，water replenish ways and recommendations for implement.**

Review the history of urban water saving strategies evolution in China. The first phase (1959-1978) is characterized by “mainly increasing water sources and promoting water-saving”. The second phase (1979-1999) is characterized by “laying equal stress on increasing water sources and water saving”. The third stage (from 2000 up to now) is characterized by “reducing expenditure is at priority, curing wastewater is the basic, and broadening water sources in multi-channels”.

Urban water saving strategies in China include the improvement of urban water saving regulations and systems, the improvement of water saving assessment standards, the establishment of water saving index systems and the innovation of water saving incentives as well as making full use of the water price lever to strengthen the urban water system planning, and pay attention to the information construction of urban water saving and carrying out water replenish, etc.

The water replenish approaches determine the executive mode of water replenish project. There are two water replenish approaches, including the direct way and indirect way. The direct way is to compensate for the water used in the production, water quality and soil erosion through engineering measures, such as water storage, sewage collection and treatment, water system improvement and diversion irrigation by those who conduct the water replenish; while the indirect way is that those who use water support others to implement the projects related to the water replenish by providing capital, technology, intellect and other elements, and those who conduct the water replenish may be involved in project planning and design, but not directly involved in the implementation and management of the specific projects, only giving advisory and consultancy on the project. On the basis of the water using features of China's industrial sectors, the water replenish theory is considered to have a broad application prospect in the fields of beverage industry, wine industry and manufacturing industry of chemical materials and products; meanwhile, the application background and ways for water replenish in various industries as well as the potential areas applied for water replenish are analyzed briefly.

**1.4 Summarize, concise and compile the research report on China's urban water-saving and water replenish, and communicate and spread the research outcomes in the urban water industry.**

Complete the project report and take the opportunities of carrying out seminars and training sessions of the project to make it exchanged and spread in the industry, and thus further improve the report based on the feedback.

8 symposiums are held from the implementation of this project, more than 150 experts or managers from corporation present these symposiums, with women representatives accounting for 35% and the age between 35 to 50 accounting for 70%.

**2.1 By access to literatures about accounting of urban water saving amount and water replenish, get an understanding of the existed statistical system and measurement methods of urban water-saving amount.**

With consulting and collecting the related documentaries about urban water saving amount / water replenish systematically, we discovered in the research that one of the methods generally used in calculating the water saving amount in China at present is to calculate the D-value between the planed water consumption and actual water consumption. But this calculation method is much subjective to determine the planed water consumptions. To study the methods of calculating the water replenish amount is of significance in guiding unifying the understanding of enterprises on the water replenish amount and encouraging more enterprises to involve in the water replenish work.

**2.2 Establish statistical methods and measurement methods of water-saving amount (including water-saving amount of facilities, leaking water amount of pipelines, recycled water amount et. al.) for different water saving ways**

On the basis of systematically combing the formula of the industrial water saving potential calculation and the methods of the urban domestic (including construction and tertiary industry) water saving potential calculation of two departments (Ministry of Water Resources and Haihe River Water Conservancy Commission), take Shijiazhuang as an example to calculate the water saving potential, and compare the theoretical water saving potential based on the two formulas with the actual water savings to explore a better way to calculate the water savings (potentials) at present.

**2.3 Establish measurement model of the amount of urban water-saving and water replenish, develop the assistant measurement software.**

According to the definition of water replenish, the water replenish amount can be calculated based on three aspects---the amount of water, water quality and soil conservation amount. Since there may be many bodies in the implementation of the water replenish project, it is required to define the contribution rate of each body in the project. The formula of overall water replenish amount can be expressed as:

WRP=∆∙α

Wherein, WRP is the water replenish amount; ∆ refers to the effect of the project implementation and α is the contribution rate of body that compensates.

On that basis, the water replenish model, water quality replenish model and soil erosion replenish model are established respectively, and software for calculating urban water replenish amount is also developed. The software will ensure the full security, stability and scalability of the system through the integrated project management, calculation of the water replenish amount and the evaluation of the water replenish level, etc. with the technology applied.

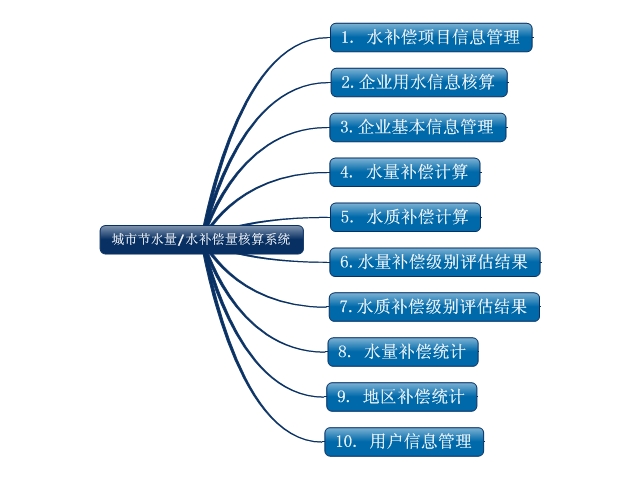


Figure System framework



Login interface

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**2.4 Invite related experts to carry out software testing and implement it in typical cities.**

Further improve the quality of software through testing, and demonstrate the application in Jinan Iron & Steel Group Corporation. Based on the calculation of the projects concerning water replenish conducted in the past five years in Jinan Iron & Steel Group Corporation, the total amount of water replenish in Jinan Iron & Steel Group Corporation is 181, 440, 000 m3 from 2007 to 2012, belonging to overflow replenish level. Meanwhile, the research group initially determined the sewage treatment centre on the east of Jinan Iron & Steel Group Corporation as the next possible cooperation project according to the research.

**2.5 Pilot in recycle of wastewater treatment.** To set up the wastewater treatment facilities.

**3.1 By holding seminars cooperating with China Urban Water Association, communicate and discuss water-saving experience, popularize water-saving technology.**

The Seventh International Conference for China Urban Water Development & Equipment Exposition were held in Ningbo from November 28 to December 1, 2012, sponsored by the China Urban Water Association, China Society for Urban Studies, Zhejiang Housing and Urban-Rural Construction Department and Ningbo People's Government, etc., and researcher Shao Yisheng, the project leader, served as the Secretary-General of the Organizing Committee. During the conference, the special forum of “Urban Water Saving and Non-Traditional Water Resource Utilization” was created for the leaders and experts from the National Development and Reform Commission, the Ministry of Housing and Urban-Rural Development, U.S. Department of Energy, Tsinghua University, Nanning Municipal Government, Ningbo Municipal Government and other departments and organizations to carry on further discussion on the themes such as the opportunities and challenges of urban water saving, sewage reclamation and reuse, sea water desalinization, urban water saving experience, etc. The project team had a further understanding on the need for water replenish activities, the key points needed to break through and the possible approaches for water replenish through the exchange, and the related results have been integrated into the project report. More than 150 experts present the forum and another 550 people are benefited from pamphlets.

**3.2 By holding seminars about water saving and water replenish cooperating with Jinan Urban Water Association, advocate and spread philosophy of water replenish, explore accounting methods of water replenish and discuss water replenish strategies.**

On September 11 and 12, 2012, the China Science Center of International Eurasian Academy of Sciences (CSC IEAS) called a seminar on “The Study of Urban Water-saving Strategy and Water replenish Approaches” in Jinan City. Participants of projects of CSS IEAS and Beijing Quanhuitongda Technological Services Co., Ltd., relevant leaders and experts from China Urban Water Association, Shandong Urban Water Association, Jinan Municipal Bureau of Public Utilities. Jinan Water and Waste Water Monitoring Center, Jinan Water-saving Regulations Office and Shandong Jianzhu University, and about 30 people from the advanced companies in water saving of Shandong Province and Jinan City such as Qingdao Beer Group, Jinan Iron & Steel Group Corporation, Jinan Pepsi Cola Co., Ltd., Jinan Hi-tech Development Zone Water Supply Co., Ltd., Jinan Machinery Co., Ltd., Shandong Normal University, Dongying Water Supply Co., Ltd present this seminar. Project team has reported project backgrounds, goals and tasks settings situation. According to the report, the participating experts, leaders and relevant responsible persons of company make further discussion about the theory connotation of water replenish, the effect, application potential, and possible consequence of the existing water-saving ideas. 30 people including officials, experts and managers present this seminar with women representatives accounting for 60 % and the age between 35 to 55 accounting for 70%.

**3.3 Hold seminars on urban water saving/ water replenish accounting, promote water replenish activities.**

September 13 to 15, 2012, after holding the seminar on “The Study of Urban Water-saving Strategy and Water replenish Approaches” the project team immediately held urban water replenish calculation seminar (training conference) in Jinan Iron & Steel Group Corporation. Participants include management and technical staff responsible for water management in Jinan Iron & Steel Group Corporation Project participants explained and publicized water replenish theory system and calculation method to the relevant personnel in Jinan Iron & Steel Group Corporation, and made a detailed introduction for application methods and matters needing attention of “city water replenish amount calculation software”. Then the relevant personnel in Jinan Iron & Steel Group Corporation practiced operation on computer with the guide from the project participants on side. On that basis, project participants and relevant personnel in Jinan Iron & Steel Group Corporation made further communication over the determination of water replenish parameter, calculation of water replenish amount, determination of water replenish level related to life water sewage farm project, comprehensive sewage farm project, Donglian water supply project, Zhang Matun mine water reclamation project, factory life water pipe network optimization project of Jinan Iron & Steel Group Corporation. More than 90 people including experts and managers from corporation present these seminars with women representatives accounting for 60 % and the age between 35 to 45 accounting for 80%.

**3.4 Organize to compile, print and spread project’s summary outcomes and other related publicity materials.**

In all previous seminars, relevant materials have been compiled and printed so that the participants could have a better understanding of project achievements and progress. At present, all the assessment indicators and expected goals have been achieved and the overall achievements of the project have been prepared. After the acceptance of the project and improvement of the project results has been made in accordance with the expert advice, the project will further prepare simple manual (datasheet) in order to spread the research results of the project as much as possible.

More than 250 various materials about this project, including project report, software (excluding pamphlets) are spread and more than 200 people are benefited from these materials；More than 2000 pamphlets about water replenish are spread, and more than 2000 people are benefited from these materials, with women representatives accounting for 40 %.

**3.5 Summary reporting and documentation**

**Sustainability**

Compared with the traditional concept of water conservation, water replenish is a brand new idea. In order to make comprehensive, sustained and further promotion for water replenish idea, this project focuses on the establishment of water replenish theory system and development and promotion of water replenish tools instead of only relying on single project. It has been proved by the facts that the water replenish theory established by the project can better fit the existing national water conservation policy and thus it has been approved by participating experts and leaders in multiple seminars; the developed “urban water replenish amount calculation software” has friendly interface, comprehensive function and other features and it has become good auxiliary tool for application demonstration enterprises to launch water replenish project.

From the specific project level, project team has initially determined eastern sewage processing centre of Jinan Iron & Steel Group Corporation as the key point of the possible follow-up project. This project will collect sewage outside of the industrial area and convert it into industrial water of the enterprise after processing. On one hand, make maximum use of water resource, and on the other hand, reduce the burden on municipal swage collection and processing system. This project has the obvious water replenish feature. At present, there still are certain restrictions on project land using. If making it as the key of the project, next effort should be made to strengthen coordination, and optimize project land using to ensure the successful development of the project.

**MDG Targets**

The launching of the project is conductive to the realization of millennium development goal that “the proportion of the population that can not constantly access to safe drinking water and basic sanitation reduces by half by 2015”. Insufficient water intake facilities and water source pollution are the important reasons why safe drinking water can not be guaranteed. The water replenish amount theory system that established in this project not only includes water amount replenish calculation, but also water quality replenish calculation. Among them, water amount replenish encourages to make up for the water intake facility and water purification facility related to the main construction, and reduce the intake amount of fresh water; water quality replenish encourages to make up for swage collection and processing facility related to main construction, and reduce the emission of pollutants so as to contribute to the drinking water security of residents.

**Partnership Effectiveness**

The main participation units of the project will include the Chinese Science Center of International Eurasian Academy of Sciences and Beijing Quanhuitongda Technical Services Co., Ltd. During the research course, the two units keep close interaction with each other; the Chinese Science Center of International Eurasian Academy of Sciences starts relevant theoretical research work, and Beijing Quanhuitongda Technical Services Co., Ltd. is responsible for the software development; the two units rely on each other with mutual support.

In the process of project development, more than 20 units participate in the project research work in different ways and different extent. With cooperation spirit and shared attitudes, the project team establishes good relations of cooperation with these units and carries out continuous improvements of project results based on feedbacks from these units.

**Cross-cutting Issues**

Environmental issues: The project carries out environmental impact assessment based on science and is conducive to help improve the water environment. If there are contents related to sewage collection and treatment, groundwater exploitation, sewage recycling and reclamation of mine water in the water replenish projects carried out by Jinan Iron & Steel Group Corporation, this will have a significant role in the protection and improvement of Jinan local water environment. Meanwhile, the Eastern Wastewater Treatment Center of Jinan Iron & Steel Group Corporation confirmed by the project does not rush to start construction, which also takes water environment factors into consideration. In accordance with the original plan, the project will encroach upon part of the river land; this will affect flood control and water environment quality. Therefore, under the recommendations of the project team, the project is making further adjustments and plans, for the purpose of coordination of land using.

**3. Project Management and Oversight**

Development programme bureau has carried out effective monitoring on implementation of the project. Through quarterly progress report of priority activities, summarize progress in the last quarter and make arrangements for work of the next quarter. In addition, the related personnel carry out consultations with personnel of the project team on problems encountered in the project development, in the form of interviews, telephones, mails and other ways to ensure smooth development of the project.

**Implementation status**

At present, the project has completed each content according to plan; project funds were fully implemented; after necessary modification, the final report can be made.

**Monitoring and Evaluation**

During project implementation period, the project team carries out three assessments on project. The first time was in March 2012, because there were many previous understanding ways of the concept of water replenish, thus the project progress was affected; through the assessment, the project team unified the understanding of concept of water replenish and clearly confirmed the basic structure of the water replenish calculation system; the second time was in June 2012, because the 2012 “International Seminars and Technical Equipment Exposition of China Urban Water Development”, which the project was based on, was delayed to be held in November; for protection of the project result quality, the project team decided to postpone the project to December 2012 and submitted the relevant applications; the third time was in December 2012; through a comprehensive assessment of internal project, the project team thinks they have completed all tasks and could make the final report.

**Human Resource Management**

Give full play to the advantages of human resources in the process of project implementation and assign relevant tasks in accordance with the principle of “use everyone’s advantages, achieve shared growth”; everyone’s task is clear, but with in close cooperation. Through implementation of the project, project management ability, implementation capacity, research capacity of researchers, teamwork ability of the project team personnel have been further improved, providing a guarantee of human resources for smooth implementation of the project.

**Risk management**

From project research, how to make the concept of “water replenish” to get public recognition is a difficult challenge that can not be ignored. Water replenish concept is a relatively brand new concept; although the project team propagandizes water replenish concept by way of seminar as much as possible, the spread scope is still relatively limited. How to make Water replenish concept to be more publicly recognized in a wider range requires senior management employers pay attention to the specific risk factors.

**Inter-Agency Coordination and Delivering as One**

 The project is compatible with the United Nations Development Assistance Framework (UNDAF), mainly reflected in “Outcome 1: the government and other stakeholders ensure the sustainable development of environment, adapt to climate change and promote green and low-carbon economy”, “Outcome 1.2: improve policies and implementation mechanisms to pay much attention to the natural resources management of the poor and vulnerable groups”. And "Outcome 1.2.1: strengthen the capabilities of government in effective management of land and water resources, to ensure that the poor and vulnerable groups get easier access to these resources”. As well as “Outcome 1.4.2: Community and family have the opportunity to get safe drinking water and appropriate sanitation conditions, especially pay special attention to women's crucial role in changes”. "The water replenish" advocates social sharing of saving capacity, and it provides such an opportunity: the individuals who are of higher water-saving ability should provide services inclusive of protection of water resources, water getting, water purification, water supply and sewage treatment for the vulnerable groups in society.

**Communication and advocacy**

More than 2200 people are benefited from discussion，seminars and various materials, with women representatives accounting for 40 %.

**4. Financial Management**

The overall project budget is US$ 40,000.

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| --- | --- | --- | --- |
|  | Source of Fund | Budget | Expenditure |
| **Expenditure Vs. Approved project budget by source of funding** | UNDP | 0 | 0 |
| Government Cost Sharing | 0 | 0 |
| Third Party Cost-sharing | 400,000 | 400,000 |
| Other (please specify) | 0 | 0 |
| **Total** | 400,000 | 400,000 |
|  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Output** | **Activities** | **Source of Funding** | **Budget Description** | **Annual Budget**  **(USD)** | **Annual Expenditure**  **(USD)** | **Note** |
| **Output 1**  Enhanced understanding on status of China’s water-saving issues and Water-saving and replenishment policies and strategies developed | **1.1**  Analyze nation’s status of water saving, key measures, potentials and relevant policies and rules, identify challenges to be addressed. | **3rd Party** | Consultancy | 40,000 | 40,000 |  |
| **1.2**  Develop research on urban water-saving strategies and replenishment measure. | **3rd Party** | Subcontract | 70,000 | 70,000 |  |
| **1.3**  Research on recycle of urban waste water and its treatment. | **3rd Party** | Consultancy | 29,000 | 29,000 |  |
| **1.4**  Evaluation and Policy framework on potential of water-saving and recycle of waste water. | **3rd Party** | Consultancy | 28,000 | 28,000 |  |
| **1.5**  Research on urban water ecology management and planning | **3rd Party** | Consultancy | 29,000 | 29,000 |  |
| **1.6**  Analysis on policy and practice in compensation mechanism for water ecology | **3rd Party** | Consultancy | 26,000 | 26,000 |  |
| **Output 2**  Corresponding water replenishment measurement tools developed | **2.1**  Develop analysis and measurement tools (software) for water replenishment in terms of ways of replenishment approaches | **3rd Party** | Subcontract | 80,000 | 80,000 |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Output** | **Activities** | **Source of Funding** | **Budget Description** | **Annual Budget**  **(USD)** | **Annual Expenditure**  **(USD)** | **Note** |
| **Output 3**  Pilot tested | **3.1**  Pilot in recycle of wastewater treatment | **3rd Party** | Consultancy | 1,500 | 1,500 |  |
| Pilot facilities | 16,500 | 16,500 |  |
| **Output 4**  **Experience summary and dissemination** | **4.1**  Summary reporting and documentation | **3rd Party** | Consultancy | 20,000 | 20,000 |  |
| **Output 5**  **MANAGEMENT** | **UNDP & CICETE GMS/ISS** | **3rd Party** | GMS/ISS | 60,000 | 60,000 |  |
|  | | | **Total** | 400,000 | 400,000 |  |

**5. Management recommendations**

**5.1 Establish a project information management system**

A project information management system is recommended to establish, which can collect the project information in certain frequency (such as once a month). Moreover, all projects can always land this system through the Internet and fill in information. The system has automatic summary, progress remind, budget monitoring and other functions, which can greatly increase the efficiency of project management.

**5.2 Develop a unified outcome publicity program for all projects.**

Currently, the outcome publicity is mastered by respective project. And, the way of "Fighting each other" makes a lot of achievements luck of good publicity. So, a unified outcome publicity program for all projects is recommended to develop, which can publish achievement of all projects in various ways, such as television, radio, conferences or internet and each project submit related material to the Project Management Office.

**6. Conclusion**

Based on the analysis of the status of China's urban water conservation as well as the legal system, major problems existing in urban water conservation pathway and urban water conservation strategies are identified. To meet the shortfall, the definition of “water replenish” is proposed and the theory framework is developed in this project. As an important way of urban water conservation, there are lots of uncertainty in water replenish area and object. According to this theory, the water replenish projects can be implanted by direct ways or indirect way, and the behaviour is non-mandatory. Furthermore, the accounting model for water replenish, water quality replenish, and soil and water conservation replenish are established. The replenish level is divided into four levels, including overflow replenishment, fully replenishment, partially replenishment and zero replenishment. In order to supply an useful and efficient tool for water replenish accounting, the urban water replenish accounting software, integrating the function of project management, water accounting of the amount of replenishment and water replenishment level evaluation is also developed in this study. As a typical case, the accounting software is used in Jinan Iron and Steel Group to evaluate the projects has launched in the past five years and the eastern sewage treatment centre of Jinan Iron and Steel Group is identified as the possible cooperation project.

In addition, the potential of water conservation and water replenish in China's beverage industry is analyzed. According to estimates, the beverage industry will need replenish 625 million m3 / year water (according to water supply amount) and 160 million m3 / year water(according to water consumption amount) in the "Twelfth Five-Year" to achieve a fully replenishment level. On this basis, the beverage industry, wine industry, chemical materials and products industry are identified as possible industry to implement water replenish project. Meanwhile, the application background, possible ways and areas are also proposed to play a certain role in guiding subsequent water replenish projects.

The launching of the project is conductive to the realization of millennium development goal that “the proportion of the population that cannot constantly access to safe drinking water and basic sanitation reduces by half by 2015” and is compatible with the United Nations Development Assistance Framework (UNDAF). It provides such an opportunity: the individuals who are of higher water-saving ability should provide services inclusive of protection of water resources, water getting, water purification, water supply and sewage treatment for the vulnerable groups in society.

At present, the project has completed each content according to plan; project funds were fully implemented; after necessary modification, the final report can be made.

**7. Annexe/s**

