

ALLEGATO I al Capitolato Tecnico

**DI CUI ALLA PROCEDURA NEGOZIATA PER
L’AFFIDAMENTO DEI SERVIZI RELATIVI ALLA
“ANALISI E VALUTAZIONE TECNICA DELLE
STRATEGIE DI RISANAMENTO DEI CORPI IDRICI
DEL DISTRETTO DI TONGZHOU NELLA
MUNICIPALITÀ DI PECHINO (CINA)”**

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Estratto da:

Technical Arrangement
on
“TONGZHOU WATER ENVIRONMENT EVALUATION and
STRATEGY” (TWEES) PROJECT - Annex 1.

Sino-Italian Beijing Environmental Cooperation Project

I. Background

1. Overview

Tongzhou District is located in the south-eastern suburbs of Beijing at the northern end of the Grand Canal (on the junction between the Tonghui Canal and the Northern Canal) and at the easternmost end of Chang'an Avenue, and it is considered the eastern gateway to the capital of the Republic. Tongzhou District borders Chaoyang District and Daxing District in the west, Shunyi District in the north, Sanhe City, Dachang Hui Autonomous County and Xianghe County of Hebei Province in the east, and Wuqing County of Tianjin and Langfang City of Hebei in the south. The downtown area of Tongzhou District is close to Beijing's Central Business District (CBD), 13 km east of ITC, 16 km south of the capital airport, and 100 km east of Tanggu port, occupying a critical position.

The district covers an area of around 906 km², 6% of Beijing's total area an east-west width of around 36.0 km and north-south length of 48.0 km.

The district is divided into 4 sub -districts, 10 towns, and 1 ethnic township. It had a population of 673,952 at the 2000 Census, and has seen significant growth and development since then, growing to a population of 1,184,000 at the 2010 Census. By the end of 2014, it has a resident population of 1.356 million, including an immigrant resident from other provinces of 0.555 million, accounting for 40.9% of resident population. 0.871 million are urban residents, accounting for 64.2% of resident population. The resident population density of the district is 1496 people/km². GDP reached 54.89 billion RMB in 2014, an increase by 8.7% over the previous year, of which the added value of primary industry accounted for 2.2 billion RMB, secondary industry 27.66 billion RMB, and tertiary industry 25.03 billion RMB.

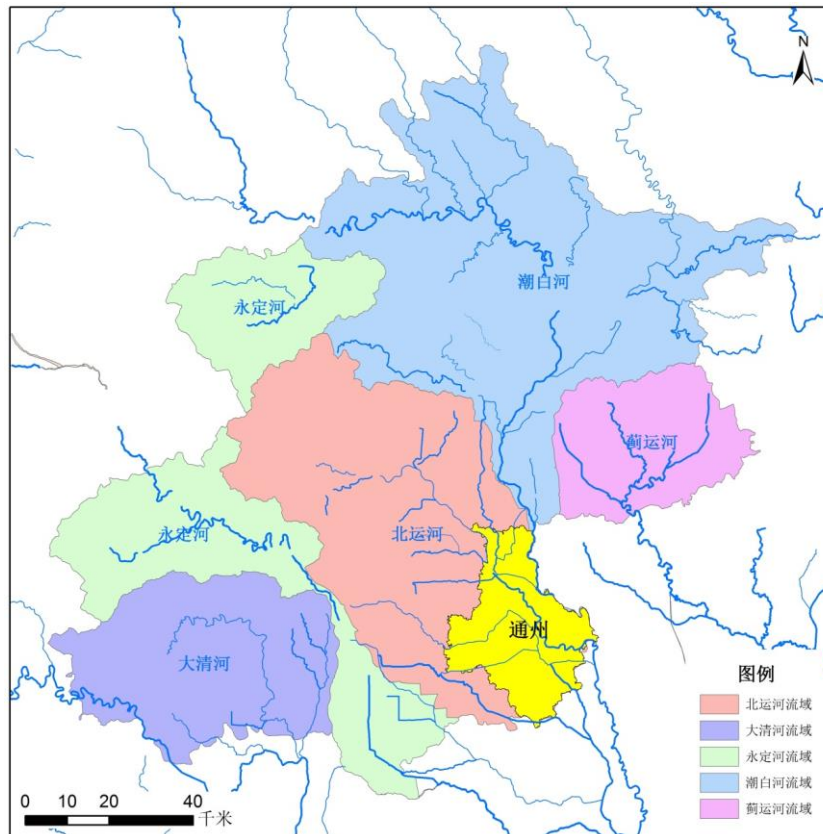


Figure 1: Location of Tongzhou District

Tongzhou administrates 11 townships and 4 subdistrict offices. By the end of 2014, it has a resident population of 1.356 million, including an immigrant resident from other provinces of 0.555 million, accounting for 40.9% of resident population. 0.871 million are urban residents, accounting for 64.2% of resident population. The resident population density of the district is 1496 people/km². Its GDP reached 54.89 billion RMB in 2014, an increase by 8.7% over the previous year, of which the added value of primary industry accounted for 2.2 billion RMB, secondary industry 27.66 billion RMB, and tertiary industry 25.03 billion RMB. The industry structure evolved from 4.1:49.3:46.6 in 2013 to 4:50.4:45.6.



Figure 2: Administrative Map of Tongzhou District

2. Water Resources

Part of Tongzhou District is located in the Haihe River Basin and it includes 13 rivers, falling into Chaobai River and North Canal these two major river systems. Chaobai River system includes Chaobai River and Yunchaojian River; North Canal system covers Wenyu River, North Canal, Tonghui River, Liangshui River, Xiaotaihou River, Fenggangjian River, Ganggou River, Yudai River, Xiaozhong River and Zhongba River. The total length of watercourse in Tongzhou District is 41.7km and the basin area is 70.0km². Tongzhou District laies in the plain area, and its total groundwater comes mainly from precipitation infiltration, river water infiltration, surface water and irrigation water infiltration, and groundwater lateral inflow. The average amount of

groundwater resources of the District is 213 million cubic meters, and its average total water resources is 1.101 billion cubic meters.



Figure 3 Water System of Tongzhou District

3. River Water Quality

The current poor water environment quality in Tongzhou District doesn't reach the established water quality standards. In 2014, under the surface water monitoring programmes of Tongzhou District, a total of 12 rivers (total length of about 190.4 km, accounting for 84.6% of the total length of rivers) in the district, has been monitored. All the 12 monitored rivers were Class V minus waters, including 11 V₃ minus rivers, and the proportion of V₄ minus rivers was 8.3% lower than previous year. The water quality of all the other rivers remained unchanged except Xiaotaihou River and Northern Tonghui Channel which changed from V₄ minus to V₃ minus and Yudai River which degraded from V₃ minus to V₄ minus. Data shows that the water quality

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of all the 12 monitored rivers did not reach water function requirements. In 2014, in 17 monitored sections of these 12 rivers, V₃ minus sections accounted for 88.2%, and V₄ minus sections for 11.8%, V₄ minus sections decreased by 5.9% over the previous year. The main pollutants are ammonia nitrogen, total phosphorus, COD, BOD and permanganate index, including both organic and inorganic compound pollution.

II. Purpose and Significance of the Project

All the waters in Tongzhou are Class V minus waters, hence arduous tasks. Among the 5 sections in Tongzhou District to be assessed by Beijing municipality, 3 of them are required to be treated to Class V or above level. And 4 of the 5 sections are state-assessing sections (2 are required to be treated to Class V or above level). The decision to build Tongzhou as a sub-center of Beijing, the “Beijing-Tianjin-Hebei Coordinated Development Guideline”, and the newly released “Beijing Water Pollution Prevention and Control Work Plan” impose more demanding requirements on water environmental protection, and thus provide great opportunities for water environment protection in Tongzhou District, and it also brings tremendous pressure and challenges to water environment improvement in the District.

Tongzhou District is not only going to become the sub-center of Beijing, but also an important fulcrum and bridgehead of Beijing-Tianjin-Hebei (BTH) integrated development strategy. On one hand, the identity of sub-center places high demands on water environment quality, and on the other hand, BTH integration also requires the District to improve its water quality with full efforts. The EU (Italy) has already successfully experienced in its urban development, the process from water environment deterioration up to water quality standards and water ecological improvement and water pollution control.

Thus, Sino-Italian cooperation in BTH (Tongzhou) regional water environment comprehensive management scheme study project would draw on the practices and experience of EU (Italy) to optimize water environment management strategies of BTH (Tongzhou) Region, which not only plays a critical role in promoting Sino-Italian cooperation in water environmental protection, but also is of great

significance for facilitating environmental protection integration in the region.

Water resource and wastewater management, or the lack thereof, has a direct impact on the biological diversity of aquatic ecosystem, affecting the integrity of the natural systems. It is therefore essential that water management be considered as part of an integrated full life cycle, ecosystem based management system across the three dimension of sustainable development.

This project is expected to setting up of a general Water Environment governance and management, paying attention to permit terms or conditions, control, monitoring, compliance measures to improve water quality in rivers, streams and other water-bodies and ensure access to good quality water, according to the Beijing Water Pollution Prevention and Control Work Plan water work plan standards, by strengthening the knowledge base for decision making concerning feasibility, effectiveness, costs and impacts of related measures and options. The results should assist policy makers in identifying and applying effective strategies towards an efficient Water Environment Comprehensive Management Scheme.”

III. Objectives

1. Reachability of BTH (Tongzhou) section assessment targets

The project is to set up water quality model, analyze and evaluate the target reachability of state-assessing and Beijing-assessing sections based on integrated water environment treatment programs and engineering measures of Tongzhou District in the 13th Five-Year period.

2. BTH (Tongzhou) Water Environment Treatment Key Technology Study and Demonstration

The project focuses on water quality standards attainment and significant improvement in key areas of BTH (Tongzhou), and it aims at introducing appropriate key technologies, through demonstration study, providing technical support assistance

for water environment treatment in Tongzhou District.

3. BTH (Tongzhou) Water Environment Management Mode Optimization

This project learns from the mature water environment Management mode of EU (Italy), carries out total pollution discharge allocation and discharge trading pilot studies in the river basins, establishing and improving a workable, replicable water environment management mode applicable to Tongzhou District.

4. BTH (Tongzhou) Water Environment Comprehensive Management Scheme Optimization

This project draws on target reachability analysis, key technologies, and management study and demonstration, absorbs EU's (Italy) successful experience in water environment management, studies and puts forward an optimized scheme for BTH (Tongzhou) regional water environment management.

IV. Implementation Plan

In order to tackle the complexity and the variety of the issues to be considered for the purpose of elaborate a thorough and comprehensive Tongzhou District Water Environment Evaluation and identify and applying effective strategies towards an efficient Water Environment Comprehensive Management Scheme, the project is composed of 2 phases:

- i. Phase 1 : Scenarios Analysis
- ii. Phase 2 : Pilot projects

1. PHASE I “Scenarios Analysis”

1.1. Regional Overview Study

The Chinese side will organize a technical expert team, collecting data to analyze

topography and water system characteristics, hydrology and water resources, meteorological and climatic conditions, vegetation cover, soil conditions, and other natural features; Chinese technical expert team also analyze administrative divisions, population distribution and density, types of industry, economic indicators, land-use characteristics and other economic and social features of the District.

1.2. Water Environment Protection Analysis

The Chinese side will organize a technical expert team for data gathering and collection and data analysis on current pollutant discharges and compositions in Tongzhou District. The activity will include: desk research, field study, department seminars, etc.

Also, Chinese side will assesses current water quality and changes in Tongzhou District, requirements of water pollution control target protocols and related planning for water quality targets in Tongzhou District, examining major water concerns and related causes in Tongzhou District, identifying the bottom line of current problems to be solved, and putting forward measures to solve these problems.

1.3. Reachability of BTH (Tongzhou) District Section Assessment Targets

Among the 5 sections in Tongzhou District to be assessed by Beijing municipality, 3 of them are required to be treated to Class V or above level. And 4 of the 5 sections are state-assessing sections (2 are required to be treated to Class V or above level).

In order to ensure standard compliance and water quality improvement, Tongzhou District will implement a number of water environment treatment projects during the 13th Five-Year period. Therefore, there is an urgent need to analyze and assess the target reachability of these sections after the implementation of these projects in Tongzhou District.

The Italian side will organize technical expert team, providing the list of water quality and hydrological data required to build water quality model, and the Chinese side will responsible for collecting water quality and hydrological data, and adds necessary hydrological monitoring. The Italian side will responsible for building water quality

assessment model.

Relying on water environment treatment projects in Tongzhou District during the 13th Five-Year period and on the built water quality assessment model, the Italian side will assess the water quality target reachability of sections to be assessed by Beijing Municipality after the implementation of environment treatment projects in Tongzhou District.

1.4. Regional Water Environmental Treatment Key Technology Study

Based on the EU (Italy) experiences on the process from water environment deterioration up to the attended water quality standards, water ecological improvement, and water ecological standards attainment in its city development, and has accumulated a wealth of successful experience in water environment management and water pollution control. Therefore, this project focuses on water quality standards compliance and significant improvement in key areas, understanding of the EU's (Italy) technologies to tackle the technical problems in current water environment treatment, and conducts pilot studies in Tongzhou, which lays a solid foundation for improving water environment treatment technology system of Tongzhou District.

1. Small scale wastewater treatment facilities and treatment technologies study

Presently, the unsatisfied sewage pipe network and flawed operation and management mechanism in dispersed residential area in Tongzhou District lead to direct discharge of wastewater and/or non-compliance wastewater treatment; due to pipe network and insufficient operating funds, wastewater treatment rate is low in most rural areas, thus polluting local water environments and calling for strengthened management. In addition, prior to the operation of the regional wastewater treatment plants, temporary small scale wastewater treatment facilities constructed for wastewater discharged at the outfall along rivers are also essential for improving water environment quality.

The Italian side will screen out 2-3 sets of sewage treatment technologies for dispersed residential areas in The EU (Italy), selects 2-3 sets of low-cost, effective and environment-friendly temporary wastewater treatment technologies and processing

facilities for river outfall treatment, and chooses 2-3 sets of rural wastewater treatment technologies suitable for northern China. The Chinese side will be responsible for selecting 2-3 residential districts, 2-3 river outfalls, and 2-3 rural settlements, while the Italian side will be responsible for designing program, introducing the selected small scale wastewater treatment facilities and treatment technologies, conducting demonstration projects, carrying out demonstration studies, and analyzing the costs, effects and applicability of treatment technologies in Tongzhou District.

2. “Black water” wastewater treatment technology study

“Tongzhou District Water Pollution Prevention and Control Work Plan” regulates clearly that black and odorous waters should be completely eliminated by 2017, and how to treat black water and in particular how to ensure no rebound after treatment remain an urgent issue to be solved.

In the process of city development and especially industrialization, the EU (Italy) also experienced wastewater, and has accumulated a wealth of successful treatment technologies and management tools for wastewater water treatment and prevention. For example, Italy was the first to develop pneumatic pump dredging boats for dredging contaminated sediment underwater, which played an important role in the wastewater treatment. To this end, the Italian side draws on the EU’s (Italy) mature technologies, selects 2-3 sets of low-cost and effective wastewater treatment technologies, and proposes follow-up management measures after improving water quality up to desired standards to ensure no rebound of treated waters.

The Chinese side will selects pilot sections, while the Italian side is responsible for designing program, evaluate the costs, effects and applicability of treatment technologies in Tongzhou District.

3. Water environment ecological restoration technology study

To ensure the assessed sections in Tongzhou District meet the requirements of the state and Beijing Municipality, ecological management and restoration must be paid due attention in addition to vigorously strengthening wastewater treatment efforts. To

this end, the Italian side drew on the EU's (Italy) mature technologies, will select 2-3 sets of low-cost and effective ecological management and restoration technologies. The Chinese side will select pilot sections, while the Italian side will be responsible for final design, introducing the selected ecological management and restoration technologies, conducting demonstration projects in Tongzhou District.

1.5. Regional Water Environment Management Mode Optimization Study

1. Total pollution discharge allocation and discharge trading pilot study

The Italian side will select type river sections (with township as unit) for pilot work based on the status quo of water environment and pollution in Tongzhou District, build river outfall-pollution load-water quality relevance technology model, calculate the maximum allowable pollution load, assign allowable pollutant discharges to each river outfall, further assign allowable pollution discharge of each river outfall to major land point and non-point pollution sources, propose point source pollution load and non-point source pollution load distribution schemes, and finally study and put forward constructive policies on improving water pollution permitting system and establishing water pollution discharge trading system.

2. Township-based water environment comprehensive management mode study

Between district-level and village-level, township plays a very important role in water environment management in Tongzhou District, and water environment management of the District will be promoted smoothly only paying due attention to township-level water environment management. The Italian side will organize technical expert team, draw on the EU's (Italy) experience, and proposes township-level water environment management mode suitable to Tongzhou District, including pollution source grid management, rural wastewater treatment and operation mechanism, cross-township section compensation mechanism, and township target responsibility system, etc.

3. Transboundary river management and coordination mechanism study

European rivers often flow across countries; Danube River basin, for example, involves 18 sovereign states. The regulation of transboundary rivers within EU

member states is mainly enabled through joint implementation of EU legislation such as “Water Framework Directive” or the like. Over the years, the EU has made remarkable achievements and accumulated rich experience in transboundary river basin management, which is of great reference significance for water environment management, especially transboundary basin management, in Tongzhou District and even Beijing.

Therefore, the Italian side will organize technical staff, draw on the transboundary river management and coordination mechanism of the EU (Italy), and put forward suggestions on “river director system” and cross-district (such as Chaoyang and Tongzhou District) transboundary river management and coordination mechanism for Tongzhou District.

4. Water environment monitoring capacity building and study tour

The Italian side will organize a Study Tour programme on water resource management, to enhance awareness and expand the knowledge base of government water utility officials, through good practices of water resource management, water treatment technologies, tools and technologies for water quality monitoring and assessment, including also site visits to water treatment plants and distribution network.

The study tour will be planned to provide an comprehensive overview of the key elements in improving the management of water resources, focussing on trade-off between water-use sectors and promoting the basin approach.

1.6. Regional Water Environment Comprehensive Management Scheme Optimization

The project aims at improving water quality to achieve higher water quality standard attainment and significant water quality improvement in key areas of the districts, drawing on target reachability analysis and key treatment technology and management study and demonstration, based on EU’s (Italy) successful experience in water environment treatment, recommending quality keeping programs for Class III

and Class IV waters, studies, and putting forward BTH (Tongzhou) regional water environment management optimization scheme.

1.7. Sino-European Technological Investigation and Exchange

Based on the Chinese side requirements, the Italian side will organize experts and technicians to carry out technical training.

The Chinese side will select a group of trainees composed by technicians and officials from Beijing Municipal Environmental Protection Bureau, Tongzhou District Government, Tongzhou District Environmental Protection Bureau, Beijing Municipal Research Institute of Environmental Protection, Tongzhou District Water Authority and other relevant units to attend the Study tour.

Upon request, the Chinese side will further organize a group of technicians and officials from Beijing Municipal Environmental Protection Bureau, Tongzhou District Government, Tongzhou District Environmental Protection Bureau, Beijing Municipal Research Institute of Environmental Protection, Tongzhou District Water Authority and other relevant units to carry out further technical exchanges, and conducts field research and study of practical cases.

2. PHASE II Pilot projects

2.1. Regional Water Environmental Treatment Key Technology Pilot Projects

Based on the EU (Italy) best practices and BAT the TWEES project Phase II will consist in:

1.Small scale wastewater treatment facilities pilot project

As described above, the unsatisfied sewage pipe network and flawed operation and management mechanism in dispersed residential area in Tongzhou District lead to direct discharge of wastewater and/or non-compliance wastewater treatment; due to pipe network and insufficient operating funds, wastewater treatment rate is low in most rural areas, thus polluting local water environments and calling for strengthened

management. In addition, prior to the operation of the regional wastewater treatment plants, temporary small scale wastewater treatment facilities constructed for wastewater discharged at the outfall along rivers are also essential for improving water environment quality.

The Italian side will organize technical expert team to select cost-effective and environment-friendly wastewater treatment technologies for dispersed residential areas, processing facilities for river outfall treatment, and chooses 2-3 sets of rural wastewater treatment technologies suitable for northern China. The Chinese side will be responsible for selecting 2-3 residential districts, 2-3 river outfalls, and 2-3 rural settlements, while the Italian side will responsible for final design program, including the selected small scale wastewater treatment facilities and treatment technologies, conducting demonstration projects, carrying out demonstration studies, and analyzing the costs, effects and applicability of treatment technologies in Tongzhou District.

2. wastewater treatment and prevention technology study and demonstration

“Tongzhou District Water Pollution Prevention and Control Work Plan” regulates clearly that waste waters should be completely eliminated by 2017, and how to treat waste waters and in particular how to ensure no rebound after treatment remain an urgent issue to be solved.

The Chinese side will selects pilot sections, while the Italian side will be responsible for final design program, introducing the selected wastewater treatment technologies, conducting demonstration projects, carrying out demonstration studies, and analyzing the costs, effects and applicability of treatment technologies in Tongzhou District.

3. Water environment ecological restoration technology study and demonstration

The Italian side will select 2-3 sets of low-cost and effective ecological management and restoration technologies. The Chinese side will select pilot sections, while the Italian side will be responsible for final design program, introducing the selected ecological management and restoration technologies, conducting demonstration projects, carrying out demonstration studies, and analyzing the costs, effects and

applicability of treatment technologies in Tongzhou District.

V. TWEES project Description of the Work Plan Phase I

The Work Plan description provided here refers solely to TWEES project Phase 1 “Scenario Analysis”.

Phase 1 will give insights about which scenarios are more capable of accomplishing with the objective to put forward an optimized scheme for regional water environment management. Hence, at this early stage, is not feasible to plan in detail activities to be performed in phase 2.

Phase 2 activities will be detailed at the end of TWEES Phase, once the scenarios space will be defined and characterised and all the evaluations fully developed.

Task 1. Performance evaluation and risk analysis

Task 1.1: Data collection and analysis: presenting the current scenario

Task 1.2 : Site Visit and Technical Meeting

Task 1.3: Scenario Analysis: Performance evaluation and Risk analysis: analyzing and evaluating the target reachability and selection of innovative technologies for rural and urban waste water treatment and ecological remediation

Task 2 Tongzhou river basin integrated water quality management optimization model

Task 2.1 Identification of suitable options and measures

Task 2.2. Tongzhou river basin water quality management optimization model

Task 3 Strategy and methodology for improved Integrated water resources management IWRM

Task 3.1 Optimizing Tongzhou River basin Management Plan

Task 3.2 Optimizing Tongzhou Water resource Management Plan

Elaboration of general governance methodology/strategy for the river basin

management (Optimization of Regional Water environment comprehensive Management Scheme) and selection of key innovative technology (monitoring station and laboratory) and solutions for water quality monitoring.

Task 4 Capacity Building and study tour

Technical exchange tour for Chinese experts: 5 Chinese experts to Italy for 7 days study

The Italian side will organize a Study Tour, including professional training sessions and site visits, on key aspect of water quality monitoring and management:

- water quality monitoring,
- analytical protocols,
- testing procedures,
- management (data programme for water quality as a basis for economic and social planning);
- Water Treatment Technologies.

Task 5 Stakeholder involvement, communication and dissemination and Final Workshop

Targeted Stakeholders involvement is planned with the main purpose of presenting, discussing and disseminating the project findings.

The project approach is highly participatory, as the Parties will actively engage a large number of stakeholders (i.e R&I community, industry, policymakers, civil society) at several steps throughout the lifetime of the project.

The final workshop will be the last project event, highlighting not only the presentation of results, but more importantly a debate among experts, policy-makers and stakeholders on the implications of the project findings, their reliability, efficacy and suitability.

VI. Outputs and Outcomes

Task 1: Performance evaluation and risk analysis

- “Site visit” Report;
- Inception Report summarizing the review of documentation (desk review and analysis) and presenting the methodological approach for the evaluations to be performed;
- Performance evaluation and risk analysis: report “Reachability of BTH (Tongzhou) Section Assessment Targets”.

Task 2 Tongzhou river basin integrated water quality management optimization model:

- Report “BTH (Tongzhou) Water Environment Management Mode Optimization”.

Task 3 Strategy and methodology for improved Integrated water resources management IWRM:

- Report “Optimization for Tongzhou River Basin Management Plan
- Report “Optimization for Tongzhou Water resource Management Plan”.

Task 4 Capacity Building and study tour

- Report of the Capacity Building training and Study tour in the field of: data-monitoring and assessment, water quality models and water resources management.

Task 5 Stakeholder involvement, communication and dissemination and Final Workshop

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- Report of the Final Workshop;
- Final Report including a summary description of project context and objectives, results and recommendations to effectively implement the enhanced Integrated water resources management IWR.