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The World Bank

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Report No: PAD1725

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$150 MILLION EQUIVALENT

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

POYANG LAKE BASIN TOWN WATER ENVIRONMENT MANAGEMENT PROJECT

February 23, 2017

Water Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective November 1, 2016)

Currency Unit	=	Chinese Yuan (CNYCNY)
CNYCNY 1	=	US$0.15
US$1	=	CNYCNY 6.78

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
CPMO	County Project Management Office
DA	Designated Account
DO	Dissolved Oxygen
EA	Environmental Assessment
ESMP	Environmental and Social Management Plan
FM	Financial Management
FMS	Financial Management System
FSR	Feasibility Study Report
GoC	Government of China
GoJ	Government of Jiangxi
GRS	Grievance Redress Service
ICB	International Competitive Bidding
JPFB	Jiangxi Provincial Finance Bureau
LMP	Lake Management Platform
M&E	Monitoring and Evaluation
MEP	Ministry of Environmental Protection
MES	Monitoring and Evaluation System
MIS	Management Information System
MOF	Ministry of Finance
NCB	National Competitive Bidding
O&M	Operation and Maintenance
PDEP	Provincial Department of Environmental Protection
PDWR	Provincial Department of Water Resources
PDO	Project Development Objective
PDOF	Provincial Department of Finance
PDRC	Provincial Development and Reform Commission
PIP	Project Implementation Plan
PLG	Project Leading Group
PMO	Project Management Office
PPMO	Provincial Project Management Office
RHS	River Head System
RP	Resettlement Plan
SA	Social Assessment

SWTP	Solid Waste Treatment Plant
TCC5	China Economic Reform Implementation Project
TTL	Task Team Leader
TOR	Terms of Reference
WWTP	Wastewater Treatment Plant

Regional Vice President:	Victoria Kwakwa
Country Director:	Bert Hofman
Senior Global Practice Director:	Guang Zhe Chen
Practice Manager:	Sudipto Sarkar
Task Team Leader (s):	Ximing Zhang, Solvita Klapare

CHINA

Poyang Lake Basin Town Water Environment Management Project

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PAD DATA SHEET

China

Poyang Lake Basin Town Water Environment Management Project (P153604)

PROJECT APPRAISAL DOCUMENT

EAST ASIA AND PACIFIC

0000009391

Report No.: PAD1725

Basic Information			
Project ID	EA Category		Team Leader(s)
P153604	A - Full Assessment		Ximing Zhang, Solvita Klapare
Lending Instrument	Fragile and/or Capacity Constraints [ ]		
Investment Project Financing	Financial Intermediaries [ ]		
	Series of Projects [X]		
Project Implementation Start Date	Project Implementation End Date		
18-Mar-2017	31-Dec-2022		
Expected Effectiveness Date	Expected Closing Date		
01-Jul-2017	31-Dec-2022		
Joint IFC			
No			
Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
Sudipto Sarkar	Guang Zhe Chen	Bert Hofman	Victoria Kwakwa

Borrower: People's Republic of China					
Responsible Agency: Jiangxi Provincial Development and Reform Commission					
Contact:	Jinhua Li		Title:	Director	
Telephone No.:	0791-88858928		Email:	jaffo@163.com	

Project Financing Data (in USD Million)					
[X] Loan	[ ] IDA Grant	[ ] Guarantee			
[ ] Credit	[ ] Grant	[ ] Other			
Total Project Cost:	219.93		Total Bank Financing:	150.00	
Financing Gap:	0.00				

Financing Source	Amount
Borrower	69.93
International Bank for Reconstruction and Development	150.00
Total	219.93

Expected Disbursements (in USD Million)

Fiscal Year	2018	2019	2020	2021	2022	2023	0000	0000	0000	0000
Annual	5.00	10.00	25.00	45.00	45.00	20.00	0.00	0.00	0.00	0.00
Cumulative	5.00	15.00	40.00	85.00	130.00	150.00	0.00	0.00	0.00	0.00

Institutional Data

Practice Area (Lead)

Water

Contributing Practice Areas

Agriculture, Environment & Natural Resources

Proposed Development Objective(s)

The project development objectives are to reduce the pollutant discharge into selected waterways, and improve management of water quality in selected counties in the Poyang Lake basin within Jiangxi Province.

Components

Component Name	Cost (USD Millions)
Component 1: Institutional Strengthening for Water Management	24.69
Component 2: Lake and River Restoration and Improvement of Wastewater Management	139.43
Component 3: Improvements in Solid Waste Management	27.68
Component 4: Project Implementation Support	5.55

Systematic Operations Risk- Rating Tool (SORT)

Risk Category	Rating
1. Political and Governance	Low
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Moderate

7. Environment and Social	Moderate
8. Stakeholders	Substantial
9. Other	Substantial
OVERALL	Substantial

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ] No [X]
Does the project require any waivers of Bank policies?	Yes [ ] No [X]
Have these been approved by Bank management?	Yes [ ] No [ ]
Is approval for any policy waiver sought from the Board?	Yes [ ] No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X] No [ ]

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment OP/BP 4.01	**X**	
Natural Habitats OP/BP 4.04	**X**	
Forests OP/BP 4.36		**X**
Pest Management OP 4.09	**X**	
Physical Cultural Resources OP/BP 4.11		**X**
Indigenous Peoples OP/BP 4.10		**X**
Involuntary Resettlement OP/BP 4.12	**X**	
Safety of Dams OP/BP 4.37		**X**
Projects on International Waterways OP/BP 7.50		**X**
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Institutional Arrangements	**X**		

Description of Covenant

Project Agreement, Section I.A.1 of Schedule. The Project Implementing Entity shall maintain the following entities with composition, powers, functions, staffing, facilities and other resources satisfactory to the Bank: (a) Provincial Project Steering Committee; (b) Provincial Project Management Office; (c) Expert Team at the provincial level; (d) Project Leading Group for each of the Project Counties; (e) County Project Management Office for each of the Project Counties.

Name	**Recurrent**	**Due Date**	**Frequency**
Project Implementation Plan (PIP)	**X**		

Description of Covenant

Project Agreement, Section I.A.2 of Schedule. Throughout the project implementation, the Project Implementing Entity and each Project County shall apply the PIP in a timely and efficient manner satisfactory to the Bank. The Project Implementing Entity shall not amend, suspend, or waive said PIP without the prior written agreement of the Bank.

Name	Recurrent	Due Date	Frequency
Annual Work Plan	X		Yearly

Description of Covenant

Project Agreement, Section I.A.3 of Schedule. The Project Implementing Entity shall and each Project County shall (a) prepare and furnish to the Bank by September 30 in each year, beginning in 2017, a draft Annual Work Plan; (b) taking into account the Bank's comments, finalize and furnish to the Bank no later than November 30 in each year, the Annual Work Plan; and (c) thereafter ensure the implementation of the Project during the following calendar year in accordance with the Annual Work Plan.

Conditions

Source Of Fund	Name	Type

Description of Condition

Team Composition

Bank Staff

Name	Role	Title	Specialization	Unit
Ximing Zhang	Team Leader (ADM Responsible)	Sr Water Resources Spec.		GWA02
Solvita Klapare	Team Leader	Senior Environmental Economist		GEN2A
Jianjun Guo	Procurement Specialist (ADM Responsible)	Senior Procurement Specialist		GGO08
Yi Dong	Financial Management Specialist	Sr Financial Management Specialist		GGO20
Aileen Bolus Castro	Team Member	Water & Sanitation Specialist	Water and Sanitation Specialist	GWA02
Bekele Debele Negewo	Team Member	Program Leader		EACCF
Chau-Ching Shen	Team Member	Senior Finance Officer	Senior Finance Officer	WFALN

Dan Xie	Team Member	Program Assistant		EACCF
Evarist F. Baimu	Counsel	Senior Counsel	Senior Counsel	LEGES
Feng Ji	Safeguards Specialist	Senior Environmental Specialist		GEN2A
Jong Ho Ahn	Team Member	Senior Water Resources Management Specialist.	Senior Water Resources Management Specialist	GWA02
Shunong Hu	Team Member	Senior Water Engineer		GWA02
Songling Yao	Safeguards Specialist	Senior Social Development Specialist		GSU02

Extended Team

Name	Title	Office Phone	Location
Charng Ning Chen	Flood Management Expert		Singapore
Jiayi Li	Project Analyst		
Wanshan Li	Wastewater Treatment Consultant		Shanghai
Xueming Liu	Sr. Economist		Beijing
Yan Sun	Participatory Management Expert		Nanjing

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
China	Jiangxi	Jiangxi	**X**	**X**	

Consultants (Will be disclosed in the Monthly Operational Summary)

Consultants Required ?	Consulting services to be determined

I. STRATEGIC CONTEXT

A. Country Context

1. China's rapid urbanization over the past three decades has facilitated impressive economic and social gains. The country became the second largest economy in the world in 2010, with over half of its population now living in cities. Between 1981 and 2012, the World Bank estimates that roughly 767 million people were lifted out of poverty. Further transition is projected to add another 300 million to China's urban population by 2030 and continue boosting economic growth. Unfortunately, China's economic gains came at a cost to the environment, with implications on health and quality of life, as environmental depletion and degradation were overlooked during China's impressive economic growth period. The cost of environmental degradation and resource depletion in China is estimated to approach 10 percent of gross domestic product, of which water pollution accounts for around 2 percent, based on China 2030 study[1] estimates. The Government of China (GoC) has recognized that it cannot continue on this road and has put in place plans to ensure the environmental sustainability of its economic development pathways.

2. Over the past 10 years, the World Bank has been an important partner with the GoC on programs to promote water sector capacity, most notably, the formulation of the China Country Water Resources Assistance Strategy (2002), which provided a review of the major water resource challenges and related government priorities. This laid the groundwork for a comprehensive World Bank-supported water program. Following this, the China Country Water Resources Partnership Strategy (2013–2020) was prepared, which included a road map for cooperation to be carried out by partners committed to the goal of integrated water resources management, particularly to address issues of water quality.

B. Sectoral and Institutional Context

3. Poyang Lake is the largest freshwater lake in China with a maximum surface area reaching 5,050 km^2 and a storage capacity of 30 billion m^3. The basin area of the lake is about 162,200 km^2 covering over 97 percent of the land area of Jiangxi Province. Jiangxi has a population of 45.62 million (of which, 51.6 percent live in urban areas) and a gross domestic product of US$253.6 billion in 2015. Its main industrial activities include car production, aviation, metallurgy, and pharmaceutical manufacturing and its main agriculture produces include paddy, wheat, rapeseed, and tea. Poyang Lake plays many vital functions in terms of environmental, social, cultural, and economic activities. The livelihood of more than 40 million people is closely linked to the water and environment of the lake. Poyang Lake feeds into the Yangtze River in the middle reach at Hukou, Jiujiang County, and plays a pivotal role in the river's seasonal flow regulation. The average amount of lake water entering the Yangtze River is about 150 billion m^3, amounting to 15.6 percent of the mean annual runoff of the river. Poyang Lake is also a wetland of national and global importance, which provides a key habitat for half a million migratory birds. It houses over 95 percent of the world's white cranes, 60 percent of

[1] "China 2030: Building a Modern, Harmonious and Creative Society." The World Bank and Development Research Center of the State Council, the People's Republic of China.

white-napped cranes, 55 percent of hooded cranes, 60 percent of the white storks, and 96 percent of the swan goose population. It is also a species gene pool with 156 kinds of aquatic plants, 136 planktons, 230 kinds of benthic animals, 58 kinds of fishes, and 89 kinds of water birds.

4. The water environment conditions are declining, mostly due to increasing pollution from municipal wastewater discharges but also from increased industrial, and rural wastewater and solid waste discharges. Currently, the Poyang Lake water is mainly used for irrigation (61.8 percent), industrial (23.5 percent), domestic consumption (8.2 percent), and other purposes (6.5 percent).[2] While its water quality has been comparatively good—with 83 percent falling under Class I–III, 13 percent under Class IV, and 4 percent under Class V,[3] recent studies under the World Bank-supported China Economic Reform Implementation Project [4] and available monitoring data of the Ministry of Environmental Protection show a trend of water quality deterioration, with chemical oxygen demand (COD) and ammonia-nitrogen (NH3-N) increasing and dissolved oxygen (DO) decreasing.

5. Key pollutants in the lake basin include COD, NH_3-N, and phosphorus (P). Heavy metal pollution is also a growing concern. Data from the Jiangxi Environment Bureau (2011–2014) show annual average discharges of lead at 6,000 kg, mercury at 67 kg, cadmium at 1,740 kg, chromium at 830 kg, and arsenic at 7,300 kg. The COD pollution is determined to be the largest at roughly 730,000 tons per year. Data on COD discharge collected by the local governments in the lake basin show that domestic wastewater (400,000 tons or about 55 percent) and agricultural sources (230,000 tons or about 30 percent) are the main causes of water pollution. Key sources of nitrogen and phosphorus are mainly domestic wastewater and agricultural nonpoint pollution. Uncontrolled solid waste disposal and insufficient treatment, and improper fish feeding and farmland fertilization practices also cause water pollution. Based on the data from provincial environmental statistics, only 79 percent of domestic wastewater is treated in the urban areas of Jiangxi Province, which is much lower than the national average of 85 percent. Similarly, solid waste collection and treatment rate in the province is 69 percent compared to the national average of 80 percent.

6. Institutional management of Poyang Lake is also challenging. There are nine Jiangxi provincial authorities[5] managing Poyang Lake with their assigned responsibilities. For example,

[2] Statistics of Jiangxi Water Resources Department. 2011–2014.

[3] Chinese surface water quality standards: Class I is good quality water, which is drinkable with simple purification (DO > 7.5 mg/L; COD < 15; biochemical oxygen demand (BOD5) < 3; NH_3-N < 0.15; P < 0.02); Class II is good quality water, which is slightly contaminated, drinkable after normal purification (DO > 6 mg/L; COD < 15; BOD5 < 3; NH_3-N < 0.5; P < 0.1); Class III contaminated water, which could be drinkable after treatment (DO > 5 mg/l; COD < 20; BOD5 < 4; NH_3-N < 1; P < 0.2); Class IV water is not drinkable (DO > 3 mg/l; COD < 30; BOD5 < 6; NH_3-N < 1.5; P < 0.3); and Class V is bad quality water (DO > 2 mg/L; COD < 40; BOD5 < 10; NH_3-N < 2; P < 0.4).

[4] China Economic Reform Implementation Project (P085124; closed on 6/30/2015). The objective of the project was to assist the GoC in implementing its economic reform and development agenda, by strengthening its institutional capacity at the national and subnational levels. One of the activities under the project was a study on building the eco-economic zone in Poyang Lake.

[5] These include the PDRC, Provincial Department of Finance (PDOF), PDWR, PDEP, Department of Forestry, Department of Agriculture, Department of Communication, Department of Sanitation, and Bureau of National Land Resources.

the Provincial Development and Reform Commission (PDRC) is in charge of planning and programming; the Provincial Department of Finance (PDOF) is responsible for financial support and budget allocation; the Provincial Department of Water Resources (PDWR) is responsible for water resources planning and implementation; and the Provincial Department of Environmental Protection (PDEP) for environmental planning and activities. However, some of the functions overlap or are not well defined, which leads to weak implementation of water management in an integrated manner.

7. Conclusions from recent research and studies identify the following key causes of increased pollution levels in the water bodies feeding into Poyang Lake: (a) lack of basin-wide integrated water/environment management; (b) weak water quality and pollution source monitoring and disclosure systems; (c) lack of public awareness and incentives in the communities on environmental protection; (d) weak enforcement of regulations related to disposal of untreated industrial and domestic wastewater directly into water bodies; (e) lack of investment in infrastructure for wastewater collection and treatment systems in urban and rural areas as well as for solid waste management in the small cities and towns and rural areas; and (f) lack of good practices on proper domestic solid waste disposal and agriculture practices.

8. The GoC and the Government of Jiangxi (GoJ) recognize the need to protect the lake and a sustainable economic development in Jiangxi and have adopted a series of measures at the national, provincial, and county levels. In 2009, the GoC issued the Poyang Lake Ecological Economic Zone Development Plan, which provides an implementation plan and 18 specific sector plans, including water quality management aimed at ecologically sustainable development of this area.

9. In 2014, the GoJ updated its provincial development plan with more effort on ecological development. In this plan, it has prescribed a series of actions and targets to reduce pollution by 2020. Based on the plan, COD would be decreased by 5 percent compared to the 2015 baseline, the wastewater treatment ratio would reach 90 percent, and urban solid waste treatment ratio would reach 85 percent by 2020. Also, the newly adopted 13th five-year plan for Jiangxi Province and the project counties stipulates that improvement of ecological conditions is one of the important goals. Following the series of plans, the GoJ has already been implementing six major ecological environment protection programs (wetland and biodiversity protection, lake-rim green belt, pollution prevention, blue sky, circular economy, and ecological culture), which have been focusing on decreasing the flow of wastes into the water bodies in Jiangxi Province, particularly from the industrial and agricultural nonpoint sources.

10. The project will greatly contribute to the achievement of these aspirations and targets and is expected to contribute to the reduction of 5.5 percent COD loads discharged from the project counties into Poyang Lake and increase of solid waste collection rate in project areas from about 51 percent currently to nearly 80 percent at the end of the project. Similarly, the lake and river restoration activities supported by the project would enhance the habitat for a sustainable function and growth of the native aquatic and terrestrial species.

11. The project component on restoration of lake and stream water environment deploys various measures to reduce nonpoint sources of pollution into the lake and stream bodies. These measures complement several ongoing pollution control programs initiated by the Departments

of Agriculture and Finance of Jiangxi Province, including the pilot subsidy program for a soil-based prescriptive fertilizing practice in all counties in Jiangxi Province.

12. The project will finance local government priorities within an integrated and participatory water management design framework. The project will complement large investments by the GoJ and project county governments in building wastewater treatment plants (WWTPs) and solid waste treatment facilities. The project will also complement the ongoing World Bank-financed Jiangxi Poyang Lake Basin and Ecological Economic Zone Small Town Development Project, which aims to improve key public services in participating small towns of Jiangxi Province through improvements to priority infrastructure. The proposed project would expand the coverage to include seven additional counties, and will particularly focus on water environment management and solid waste management infrastructure.

C. Higher Level Objectives to which the Project Contributes

13. The project is aligned with the World Bank Group's Country Partnership Strategy for FY 2013–2016 (Report 67566-CN) discussed by the Board of Executive Directors on November 6, 2012, specifically the objectives set under Focus Area I 'Supporting greener growth', which is an outcome of demonstrating sustainable natural resources management. In this case, the project will take an integrated approach toward managing water in an environmentally sustainable manner. The project design is in line with the National Strategic Development Plan of China, as envisioned in the Poyang Lake Ecological Economic Zone Development Plan and Jiangxi Province's Implementation Plan for the Establishment of Ecological and Civilization Demonstration Areas (2014). The project is also in line with the 13th five-year plan of Jiangxi Province and participating counties.

14. The project is expected to contribute to Jiangxi's strategy on ecological civilization. The strategy focuses on applying systematic treatment and a combination of structural and nonstructural measures in the water sector to promote ecological safety, economic security, and the safety of human health and lives. The project would contribute to the lake becoming an important area for the Chinese water system through integrated[6] and participatory approaches, sustainable water and environment management, improvement of ecological conditions, and promotion of social and economic environment of the Poyang Lake Basin.

15. The project will also contribute to the achievement of the World Bank's twin goals of ending extreme poverty and boosting shared prosperity. There are 0.39 million poor people (with annual income less than CNY 2,800), or nine percent of the total population in the project area. Two of the seven project counties are designated as national poverty counties. This population is expected to directly benefit from the project, most importantly through improvement of living conditions. Jobs will also be created during the construction and maintenance phases of works supported under the project. The project is also expected to boost shared prosperity as a wide range of the population will benefit through improvements in water quality in and around Poyang

[6] 'Integrated approach' refers to a mechanism whereby structural and nonstructural measures are fully used so that management of environmental protection is done in a collaborative and coordinated way throughout the project cycle involving all stakeholders (from different sectors and disciplines) and based on consensus building to ensure sustainability.

Lake. The benefits include reduction of health risks and increase of economic activity, including recreation and tourism activity.

16. Parallel to the investment support, the project will provide plans on the institutional aspects of water quality management. This includes the development of an institutional framework that ensures sound coordination with relevant agencies that help manage the lake's water environment through the proposed Lake Management Platform (LMP). Such a platform is expected to significantly contribute to the overall impact of Poyang Lake environment quality by facilitating the identification of hotspots and targeting interventions in systematic way.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

17. The Project Development Objectives (PDO) are to reduce the pollutant discharge into selected waterways and improve management of water quality in selected counties in the Poyang Lake basin within Jiangxi Province.

Project Beneficiaries

18. The key beneficiaries of the project include about 4.4 million residents, of whom around 50 percent are female, in the seven selected counties/cities in Jiangxi Province. The project will also indirectly benefit an additional 20.3 million rural and urban residents, participating farmers and fishermen living around Poyang Lake, and tourists visiting the cleaner lake water supported by the project.

PDO Level Results Indicators

19. The proposed PDO level results indicators include: (a) direct project beneficiaries (core sector indicator), of which female beneficiaries; (b) volume (mass) of COD pollution load reduction achieved under the project (core sector indicator, tons per year);[7] (c) a under the project (core sector indicators, tons per year); (d) industrial or municipal solid waste reduced or recycled under the project (core sector indicator; tons per year)[8]; (e) number of project counties that apply participatory water quality management system; and (f) LMP established and operational.

III. PROJECT DESCRIPTION

A. Project Components

20. The project will be implemented over a period of five years and will finance priority investments in the Poyang Lake Basin. The project will consist of the following four components with a total estimated project cost of US$210.72 million. Additional cost of US$9.21 million is

[7] COD is chosen as a PDO indicator for pollutant load removal from domestic wastewater management to ensure reliability of the data during implementation, as COD measurement is a mandatory requirement from the MEP.
[8] The project will address domestic solid waste collection; as such the indicator will account for domestic solid waste reduced or recycled.

estimated for interest during implementation (US$8.13 million) and front-end fee and commitment fee of the World Bank loan (US$1.08). The total cost of the project—including the investments, interest, and charges—is estimated to be US$219.9 million. This will be financed through an IBRD loan of US$150 million and counterpart resources from the Jiangxi Province. Annex 2 shows the detailed project description. Annex 6 shows the map of the project activities.

Component 1: Institutional Strengthening for Water Management (with base cost of US$24.69 million)

21. The key activities include the following:

(a) **Establishment of the LMP designed to strengthen the Poyang Lake Basin's management, institutional, and knowledge sharing architecture.** The LMP is intended to provide an efficient institutional framework that ensures sound coordination with affiliated agencies involved in managing the lake's water environment[9];

(b) **Establishment of water environment monitoring systems**, through installation of monitoring stations, provision of monitoring equipment and facilities as well as establishment of integrated information monitoring system and early warning system; the water environment monitoring systems will provide information for government decision making for integrated water environment management and public awareness on environmental protection;

(c) **Preparation of studies related to ecological protection of Poyang Lake.** This will include financing mechanisms to improve water management. Incentive mechanisms designed to reduce nonpoint source pollution from agricultural and aquaculture practices will also be considered;

(d) **Preparation of sensitivity assessment of Poyang Lake.** This would strengthen basin-wide water environment management planning through evaluation of water quality improvement and protection, water quantity management, land use changes, biodiversity conservation, urbanization and demographic changes, tourism impact and industrialization, basin pollution, with climate resilience and adaptation measures;

(e) **Enhancement of participatory sustainable lake basin management.** This would include disclosing information about Poyang Lake protection to the public and grassroots level organizations; provision of training to personnel of organizations responsible for water quality monitoring and environmental enforcement; and

[9] Given the importance of such platform and institutional arrangements in the Poyang Lake Basin, the management arrangements will be designed in detail as part of the project implementation, taking into account best international practices, yet considering local conditions and aspirations. Current institutional architecture, which includes the 'River Head System' – leader of the party as a 'river head', the mayor of the county as 'river implementer' and a high-level leading group for strategic orientation and guidance', will be the likely basis for such a platform. For details on the River Head System, see annex 3.

ensuring soundness of infrastructure design and operational sustainability through environmental awareness and social activities at the county and village levels.

Component 2: Lake and River Restoration and Improvement of Wastewater Management (US$139.43 million)

22. This component will restore river and lake environment for Yugan, Poyang, and Duchang Counties and improve domestic wastewater system in Duchang, Jing'an, Fengxin, and Jishui Counties. The main activities include the following:

(a) **Restoration of lake and river environment in Zhuhu Lake, Pipa Lake, and Zoujiazui lakes and stream**—located respectively—in Poyang, Yugan, and Duchang Counties. The restoration measures include: (i) construction of bio-retention swales to intercept runoff pollutants from being discharged directly into the lakes; (ii) removal of a small amount of lake sediment to reduce the inner lake pollution source; (iii) development of constructed wetlands designed to remove pollutants from storm water to be discharged into the lakes; (iv) rehabilitation of water diversion structures, including four sluice gates and one pump station; and (v) 'nonstructural' measures, including introduction and coordination of best farmland practice/regulations, and sound aquaculture practices.

(b) **Enhancement of wastewater management** through: (i) construction of wastewater interceptors/collections and storm water pipelines, as well as associated roads rehabilitation to improve the wastewater collection systems in towns of Fengxin, Duchang, Jing'an, and Jishui Counties; the project will not set up new wastewater/solid waste treatment plants (SWTPs); (ii) construction of rural wastewater collection systems and small wastewater treatment facilities such as wetlands and wastewater treatment tanks in villages around lakes; and (iii) establishment of sewerage household connections in Poyang County.

23. The wastewater collection system will connect to county WWTPs, which have sufficient treatment capacity and satisfactory operation. One of the purposes of this component is to demonstrate an integrated watershed management approach by focusing on key areas for protection, improving water quality, and environmental protection, and establishing ecological pollution-control zones.

Component 3: Improvements in Solid Waste Management (US$27.68 million)

24. This component will improve solid waste collection and transportation systems in the rural and urban areas of Duchang, Yugan, Jing'an, and Shangli Counties, to reduce solid waste disposal to the lake/river systems of the Poyang Lake basin. The collected solid waste will be treated and disposed to local landfills—in Yugan and Jing'an Counties. The main activities include the following:

(a) Provision of solid waste bins and construction of solid waste collection stations (a total number of about 24,000);

(b) Provision of solid waste collection vehicles (a total number of about 101);

(c) Construction of nine solid waste transfer stations;

(d) Installation of local solid waste management information system in Shangli, Duchang, and Jing'an Counties to ensure proper management of solid waste collection and transfer systems created under the project and to integrate the existing urban solid waste management system with the newly established system. The solid waste collection and transportation system will connect to existing SWTPs in the three counties. The management information system will also be linked to the local county urban management information systems, which are currently being set up;

(e) Investments at the village level for the improvement of solid waste collection would be implemented through public participatory method, using a participatory manual.

Component 4: Project Implementation Support (US$5.55million)

25. Supporting the overall capacity of the Project Implementing Entity to coordinate, manage, and supervise the implementation of the project, including: (a) provision of consulting services to enhance engineering design, construction supervision, and environmental and social management; (b) carrying out of capacity-building activities through workshops, training, and study tours; (c) carrying out of financial management (FM), procurement, contract supervision and monitoring and evaluation (M&E), including procurement of external social, resettlement and environmental monitoring services; and (d) the operation of Project Management Offices (PMOs) (including the purchase of office equipment).

B. Project Financing

26. **Lending instrument**. The lending instrument for the project is Investment Project Financing. The project aims to reduce pollutant flow into water bodies in the Poyang Lake basin, and investment in infrastructure in combination with nonstructural measures is deemed to be the optimal choice to achieve this objective. Given the potential environmental and social risks associated with such investments, Investment Project Financing has been chosen as the lending instrument.

27. **Project cost and financing.** Project costs are estimated at US$219.93 million, inclusive of price and physical contingencies, interest during construction, commitment fee, and front-end fee. The project will be financed by the proposed IBRD loan of US$150.00 million (about 68 percent of total project cost) and local counterpart funding of US$69.93 million from the financial budget of Jiangxi provincial and county governments. The World Bank loan will be on standard IBRD terms for a London interbank offered rate (LIBOR)-based, U.S. dollar-denominated variable spread loan, with a maturity of 25 years, including an 8-year grace period, a front-end fee of 25 basis points, and a commitment charge of 25 basis points. The counterpart funds will be provided by the county and provincial governments, using their budget revenues, as well as by attracting grant financing from the central and Jiangxi provincial governments.

Project Costs and Financing Plan

Project Component	Total		IBRD		IBRD
	US$, millions	CNYCNY, millions	US$, millions	CNY, millions	%

A. Institutional Strengthening for Water Management	24.69	162.94	23.84	157.36	97%
1. Establishment of lake management platform	0.70	4.62	0.70	4.62	100%
2. Establishment of water environment monitoring systems	16.55	109.21	16.49	108.81	100%
3. Preparation of studies related to ecological protection of Poyang Lake	0.07	0.46			0%
4. Preparation of vulnerability assessment of Poyang Lake	0.35	2.31			0%
5. Enhancement of participatory sustainable lake basin management	7.02	46.34	6.65	43.93	95%
B. Lake and River Restoration and Improvement of Wastewater Management	139.42	920.20	105.50	696.31	76%
1. Restoration of lake and river environment	53.85	355.40	42.07	277.66	78%
2. Enhancement of wastewater management system	85.57	564.80	63.43	418.65	74%
C. Improvements in solid waste management	27.68	182.62	20.14	132.93	73%
D. Project implementation support	5.55	36.72	0.14	0.93	3%
Baseline Costs	197.34	1302.48	149.62	987.53	76%
Contingencies	13.38	88.23	0.00	0.00	0%
Total Project Cost	210.72	1390.71	149.62	987.53	71%
Interest during implementation	8.13	53.65	0.00	0.00	0%
Front-end fee	0.38	2.47	0.38	2.47	100%
Commitment fee	0.70	4.65	0.00	0.00	0%
Total Financing Required	219.93	1451.48	150.00	990.00	68%

C. Lessons Learned and Reflected in the Project Design

28. Project design has incorporated lessons learned from similar operations both globally and in China.

29. **Lessons from the ongoing Jiangxi Poyang Lake Basin and Ecological Zone Small Town Project.** The project faces risks on institutional capacity and interagency coordination, an issue that is also observed in other provinces in China. Collaboration in controlling and reducing pollution at the source is the most effective way of environmental management. This requires clarity of responsibilities of each authority as well as full collaboration to meet the joint objective of having a cleaner environment. Similarly, frequent changes in investment decisions slow down project implementation. It is critical that county governments maintain ownership of the proposed subprojects, even with the change of the county leadership, to ensure continued focus on agreed project activities and development objectives. To address these institutional risks, a participatory approach is being adopted for environmental management under the project. In addition, county governments have provided official commitment letters to the provincial government upon the request of the PDOF and PDRC, stating that the county governments will implement project activities in accordance with the project activity plan designed and agreed during project preparation.

30. **International best practices in the management of water body pollution control and environmental improvement.** Lessons learned from World Bank-financed pollution control and

ecological restoration projects as well as lessons from other countries have been used to inform project design, particularly in relation to the following:

(a) **Establishment of the LMP as a basis for institutional cooperation and information sharing.** The World Bank-financed Iran Northern Cities Water Supply and Sanitation Project that aimed to reduce pollutant loads to the Caspian Sea highlights the importance of closely coordinating activities among various sectoral stakeholders so that the benefits are realized on time. The forms, functions, and responsibilities of the LMPs in various regions/countries differ. For example, the Chesapeake Bay Restoration Program in the United States is a regional partnership that brings together all levels of stakeholders, including leaders and experts from a vast range of agencies and organizations, including federal and state agencies, local governments, nonprofit organizations, and academic institutions. Partners work together through the Bay Program's goal teams, work groups, and committees that ensure effective collaboration and information sharing;

(b) **Comprehensive lake-wide sensitivity assessment.** The need for a lake-wide perspective in tackling environmental degradation has proven to be a vital element for the success of the Lake Victoria Environmental Management Program. Such comprehensive lake management plans have also been prepared as part of other established lake basin restoration programs (for example, 'Opportunities for Action: An Evolving Plan for the Lake Champlain Basin [United States/Canada], Comprehensive Management Plan for the Pontchartrain Basin [United States]). Vulnerability assessment for Poyang Lake could improve integrated lake management planning;

(c) **A participatory approach has proven an essential element in nearly all water quality improvement programs.** For example, the Lake Victoria Environmental Protection Project proved that involvement of communities in watershed management is a prerequisite to successful control of nonpoint sources of pollution. The Lake Champlain Basin Program works in close partnership with government agencies from New York, Vermont, and Québec; private organizations; local communities; and individuals to coordinate and fund lake restoration efforts. The Lake Action Plan is available as an online management plan. This allows the agencies and the public to learn about the plans and activities intended to clean the lake;

(d) **Financial incentives for lake water protection.** The recently piloted River Head System in the Poyang Lake basin serves as an important incentive (for details see annex 3) in taking individual responsibility for the water environment. The project proposes to carry out additional detailed research on other forms of incentives. International experience will be considered, for example, (i) compensation schemes for fishery management in Biwa Lake (Japan), which allows fishermen to acquire specialized fishing boats and gear that reduce over-fishing; (ii) imposition of annual fee to be paid by the aluminum smelter and hydropower producer of Lake Toba (Indonesia); and (iii) 'polluter pays' principle for pollution control in Seine Normandy River Basin (France).

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

31. Project implementation arrangements have been set up at the provincial and county levels. Institutional responsibilities are summarized in the following paragraphs. The current institutional setup and details on proposed institutional responsibilities are described in annex 3 and in the Project Implementation Plan (PIP).

32. At the provincial level, a Provincial Project Steering Committee (PPSC), an interdepartmental joint committee, will be set up, comprising the PDRC (as the lead organization) and the provincial Departments of Finance, Housing, Land and Resources, Environmental Protection, Water Resources and Agriculture. The PPSC will convene meetings periodically to provide guidance and coordination on important aspects of the overall Poyang Lake management and specifically, project-related issues.

33. At the county level, a leading group will be set up to guide and coordinate important matters associated with project development of the respective county. For details on proposed institutional setup, see annex 3. Project preparation and implementation have been delegated to the Provincial Project Management Office (PPMO), which is housed in the Foreign Investment Management Office of the Jiangxi Provincial Development and Reform Commission. This office has been managing several World Bank- and Asian Development Bank (ADB)-financed projects for the past 20 years and has accumulated rich experience in project management. This office is also the PPMO of the ongoing World Bank-financed Jiangxi Poyang Lake Basin and Ecological Economic Zone Small Town Development Project. It is fully resourced and adequately staffed (with a project coordinator and technical specialists for finance, procurement, and water resource management).

34. At the county level, all seven project counties have established their Project Leading Groups (PLGs) and County Project Management Offices (CPMOs). The PLGs are headed by the respective county mayors or standing vice mayors, and formed by various government line agencies. PMOs are established in the County Development and Reform Commission, Foreign Investment Management Office, or Poyang Lake Basin Management Office. Although Poyang and Yugan Counties have experience in managing World Bank-financed projects, other counties do not. To address this risk, an expert group—comprising specialists in the areas of water environmental management, wastewater management, environmental monitoring, and solid waste management—was hired by the PPMO. Moreover, training and capacity-building activities meant to clarify the role of each of the implementation party will be conducted early on in the project implementation.

B. Results Monitoring and Evaluation

35. The primary tool to monitor and evaluate project results will be the Results Framework, which is detailed in annex 1. The Jiangxi PPMO will consolidate information and data at the project level to measure the project performance and the achievements of the targets set, and prepare semiannual progress reports. A monitoring and evaluation system (MES) will be

developed and established under the project and will be implemented by the PPMO and the CPMOs and include the following:

(a) **Management Information System (MIS).** A project specific computer-based MIS will be developed by the PPMO based on the MIS used in the previous projects, and installed in all PMO offices for progress monitoring and reporting physical and financial progress. MIS data will be consolidated at the provincial level, and semiannual reports will be provided to the World Bank.

(b) **MES.** A computer-based MES will be established to monitor project outputs and outcomes. The system will include a database for overall project outcome or PDO indicators and intermediate outcome indicators from each component, with baseline and target values.

C. Sustainability

36. Sustainability will be achieved through strong government commitment, public participation and ownership of project interventions, and systematic analysis and design to ensure technical robustness, reliability, reproducibility, cost-effectiveness, and environmental sustainability.

37. **Institutional sustainability.** Jiangxi Province has established project organizations at the provincial and county levels and has identified sources of counterpart funding for project implementation and operations and maintenance (O&M) of assets. The province is familiar with the complexity of this institutional framework, having three decades of partnership with the World Bank and implementing about 30 projects aggregating over US$1.5 billion. However, only two of the seven project counties have previous experience in managing World Bank-financed projects. Institutional sustainability will be enhanced through public participation and intensive consultation with a wide range of stakeholders and through capacity building for implementing agencies, PMOs, line agency staff, and beneficiaries.

38. Local institutional setup and capacity assessment of the agencies who would be responsible for the O&M of invested assets has been carried out during project preparation. Efforts have been made to separate the service provision function from local government agencies. Further, an assessment of the expected service provision function has been carried out and proposals such as training and community participations made to further improve the capacity of relevant local agencies to ensure the sustainability of invested assets.

39. **Sustainability of long-term O&M.** The level and quality of services provided for wastewater and solid waste collection in the project counties vary and are considered relatively low mainly because there is still heavy reliance on the local governments' limited resources. Some counties such as Shangli, Jing'an, and Duchang have started to tap the services of private sector firms for solid waste management. To ensure sustainability of the long-term O&M, a well laid out plan for fund-raising, preparation of proper technical O&M manuals and asset transfer to the institutions that would be responsible for O&M of post-project operation have been incorporated as part of the preparation work. The tasks on restoration of lake and river environments incorporate the 'ecosystem' (such as bio-retention trenches and constructed

wetlands) as well as 'non-structural' measures (such as introduction of best farmland practice/regulations, and sound aquaculture practices). With regard to O&M, these practices are more cost-effective and sustainable than the conventional structural approach. Adequate maintenance plan and manpower provision should be established to achieve the goal of long-term enhancement of the lake and stream environment.

40. For the long-term O&M sustainability of solid waste management activities, considerations have been given to the selection of waste collection points that are convenient for residents; proposals for purchase of collection vehicles with high efficiency; optimization of collection route; cost optimization to decide whether a transfer station is needed; facility and vehicles sharing at the township level; and institutional setup (at the township level or at the county level for daily routine O&M). In addition, the rural sewage treatment and solid waste management facilities will be managed by the villagers, which will support sustainability of operations.

41. **Technical sustainability**. The design of each component and major subprojects will be optimized to ensure technical robustness and cost effectiveness. The project is being designed based on the concept of: (a) accurately identifying and analyzing the problems and their systematic resolution; (b) applying an integrated and participatory approach for sustainability of environmental management; (c) combining investment and institutional capacity-building measures; and (d) introducing technical and management innovation, building on lessons learned from other similar projects.

V. KEY RISKS

42. The overall implementation risk is rated Substantial based on the risks of the following factors summarized below:

(a) **Technical design of project.** The project involves relatively complex technical solutions, each of which, have to deliver results to reach the project objective. To address this risk, the participation of competent and experienced professionals during implementation will be critical. This way, the technical solutions will be planned, designed and implemented in a way so that the project objective is met. In particular, the household connection to the new sewer network in the project area will be carefully managed by each CPMO.

(b) **Institutional capacity for implementation and sustainability.** Among seven project counties, only two have World Bank project experience. This creates an implementation risk. This risk will be mitigated by hands-on guidance from the PPMO which has rich experience in managing World Bank projects, as well as advice from an 'expert group' and targeted training. Similarly, the current fragmented institutional responsibilities for the cleanup of Poyang Lake is an additional risk, which will be mitigated through the establishment of the LMP.

(c) **Stakeholder - changes of investment priorities.** Frequent changes of the PLG and PMO leaders are substantial risks in Jiangxi Province, as evidenced during implementation of the ongoing Jiangxi Poyang Lake Basin and Ecological

Economic Zone Small Town Development Project. Such changes may result in changes of priorities and hence investment decisions, thus slowing down project implementation and creating a risk to meet project objectives. To address this risk, it is critical that county governments maintain ownership of the proposed subprojects. The presence of adequate qualified project staff at the county level, including CPMOs and PLGs, is an important aspect that will be highlighted during project implementation.

(d) **Others - uptake of participatory approach.** Although a participatory approach is a new concept in the lake management in Jiangxi Province, it has been successfully utilized during preparation of social and environmental safeguards documents. A series of trainings in the participatory lake management approach has been conducted and a participatory manual prepared to guide the implementation has been prepared to ensure the risk of a participatory approach not being followed.

VI. APPRAISAL SUMMARY

A. Economic and Financial (if applicable) Analysis

43. **Expected development impact.** The project will generate a broad range of benefits, including an improved environment and reduction of health risks. Specifically, the project interventions will help to reduce the pollution load discharged into Poyang Lake and contribute to the improvement of public health and the living conditions in the selected seven counties. The project will also invest in pollution source control, which is a cost-effective way and long-term solution to protecting the environment.

44. **Economic analysis.** The environmental benefits of the project are difficult to quantify. Thus, a cost-effectiveness approach was adopted to ensure that investments under the project are economically viable. Once the technical design was selected, a cost-effectiveness approach was employed to select the least-cost option (for equipment, works and O&M costs) to achieve the development targets. With regard to alternatives evaluated, for solid waste treatment, the choice of collection vehicles, collection points, and transfer stations was optimized after various locations were considered. For wastewater management, the collection system and treatment facilities were optimized for least-cost solution (different options of gravity flows, pumping size, pipe diameters, and materials were considered). For example, for each project intervention, technical design alternatives and location options were evaluated on the basis of technical, environmental, and economic criteria to identify the most cost effective solution. With regard to the design of the collection system, various topological, land availability, gravity flow versus pumping stations cost considerations, etc. were evaluated and checked for consistency with projected local development patterns and the existing drainage master plans.

45. **Financial analysis.** The project will not set up new wastewater/SWTPs, apart from the small-scale wastewater treatment facilities. Rather, the project interventions will focus on increasing the coverage of sewer and solid waste collection. The current solid waste management operations are managed by the county's environmental sanitation stations—under the Construction Commission/Bureau—mainly responsible for providing collection, transportation, and disposal services in an integrated manner. Solid waste management services currently rely

on significant budgetary transfers—in light of relatively low solid waste user charges (US$30 per household per year) and low collection rates (51 percent). The project will support the counties in establishing realistic tariff targets and help increase revenue collection efficiency rates (85 percent), which are key drivers for their financial sustainability. In urban areas, wastewater treatment costs are covered by a surcharge embedded in the water tariffs following the national and provincial decrees, while in rural areas, small-scale wastewater treatment facilities built will be managed by the villages through beneficiary participation.

46. **Fiscal impact analysis.** Fiscal impact analysis of the project has been conducted to ensure that the selected counties have sufficient financial resources to cover: (a) counterpart fund requirements; (b) loan repayment; and (c) additional O&M costs for works put up under the project to be covered by budget allocations. The analysis concluded that these project counties are all in a fiscal position to honor project related financial obligations, which only account for a small portion (from 0.5 percent to 2.3 percent) of their respective total government project budgets. Details of the analysis are presented in annex 5.

B. Technical

47. **Wastewater management.** The wastewater management component includes two parts, that is, urban and rural wastewater management. The urban wastewater management activities have been designed with the target of increasing the coverage of sewer collection. The additional wastewater will be transferred to existing WWTPs with a goal to use their existing capacity. The design is also based on the thorough analysis of projected wastewater generation through water demand projections rather than using water consumption quotas suggested in the national standard. Review of the existing wastewater plants and the expansion plans found a sufficient capacity with satisfactory operations to meet the needs of the project to achieve regulatory effluent standards. A similar principle also applies to the design of rural wastewater activities, including the household connections. The project will support the small-size wastewater treatment facilities, as may be appropriate, to be built to achieve 80 percent of wastewater treatment ratio in the selected villages.

48. **Restoration of lake and river environment.** The project activities include restoration of water environment in the Zoujiazui Lake-stream corridor in Duchang County. The restoration of the stream channel and corridor of the Zhoujiazui Lake catchment in Duchang County is a sound project to showcase the restoration of the catchment into an ecologically sustainable natural habitat, unique to the Poyang Lake basin.

49. The water quality of Zhuhu Lake in Poyang County has deteriorated, resulting from the point sources and nonpoint sources of pollution in the catchment and fish-farming and pearl culturing practices in the lake. An integrated and participatory approach will be implemented to improve the water quality in this catchment, with combined structural and nonstructural measures, such as construction of water cycling facilities, pollution treatment, and the establishment of financial incentive schemes and demonstration of use of environmentally friendly practices for farmers and fishermen.

50. The water quality of Pipa Lake in Yugan Town has deteriorated over the years because of sewage inflow, dumping of solid wastes, and pollution from agricultural, fish-farming, and pearl

production practices. The project will introduce various structural and nonstructural measures, including a scheme to replenish lake water through diversion of freshwater from Xinjiang River, to improve the quality of lake water and its environment.

51. The abovementioned activities will demonstrate the merit of adopting the integrated and participatory approach toward the restoration of lake and stream environment. Adapting and replicating similar environmental restoration practices in other catchments will ultimately contribute to the overall improvement of water quality in the receiving Poyang Lake.

52. **Solid waste management**. The solid waste management component has been designed based on operational disciplines for a domestic solid waste management system. Engineering design has been prepared according to different community characteristics (in rural and/or urban area). Depending on each local situation, effort has been made to design a robust solid waste collection, transportation system, and also ensure its cost-effectiveness. In the meantime, existing local solid waste management facilities have also been carefully integrated into the planned collection and transportation system to ensure a well-established local solid waste collection, transportation, treatment, and disposal system. The existing local SWTPs were also checked; they have sufficient capacity and could be satisfactorily operated for another 15–20 years. Assessment of professional service providers who have signed treatment/disposal contracts with the county governments also indicate that they apply proper treatment and disposal of collected solid waste.

C. Financial Management

53. The proposed FM arrangements are largely based on those established under the ongoing World Bank-financed project whose performance has been satisfactory during project implementation. The World Bank loan proceeds, including overseeing the Designated Account (DA), will be managed by Jiangxi Provincial Finance Bureau (JPFB). The primary FM responsibilities of the PPMO will be reviewing expenditure reporting submitted by the CPMOs and finalizing and submitting financial reports to the World Bank. The primary FM responsibilities of CPMOs are preparing the annual plan and ensuring that counterpart funds included in the project annual plan are committed by the county government, requesting payments to contractors, recording project activities and investment, and preparing financial reporting. An action plan to strengthen FM capacity has been agreed with the implementing agencies, including preparation and distribution of FM manual, provision of extensive training, establishment of systematic monitoring mechanism and close monitoring of project counterpart funds. The FM assessment concluded that with the implementation of the proposed actions, the project's FM arrangements satisfy the World Bank's requirements under OP/BP 10.00.

54. Retroactive financing of up to US$30 million would be available for eligible expenditures incurred on and after January 1, 2017. Retroactive financing will be processed according to the requirements specified in the loan agreement and project agreement.

D. Procurement

55. Procurement will be conducted by the PPMO with assistance from a procurement agent company to be selected. Most contracts will, however, be signed and executed by the CPMOs.

An assessment of the capacity of the PMOs to implement procurement under the project has been carried out. The key risks identified are (a) possible delay in procurement caused by delay in completion of the detailed design and preparation of the technical specifications; (b) potential inconsistencies from the World Bank's Procurement Guidelines arising from insufficient experience of PMOs in World Bank-financed projects; (c) potential delay in procurement and implementation of the contracts caused by insufficient counterpart fund from the county governments; and (d) cost overrun and other variations during contract implementation arising from rough design and quantities in the bidding documents and change of master plan of the county governments.

56. Suggested mitigation measures include the following: (a) the counties should expedite the designs of relevant project components; (b) the bidding documents should be prepared based on the detailed design rather than the preliminary design; (c) the World Bank team is to provide support to the PMO in setting out appropriate procurement strategy and technical specifications and in handling special procurement arrangement, if applicable; (d) the World Bank team is to provide support in contract management at post-contract award stage to assist the PMOs in handling contract variations; and (e) the local governments should secure the annual counterpart funding from their budgets.

57. The draft Procurement Plan for the project has been prepared by the PPMO. It will be updated annually or as required to reflect project implementation needs. A summary of the procurement capacity assessment and project procurement arrangements is provided in annex 3.

E. Social (including Safeguards)

58. The project would improve the water environment and bring many social benefits for citizens, including improvement of health, living conditions, asset value and income opportunities. On the other hand, the potential adverse social impacts may relate to land acquisition and resettlement due to construction and/or operation of the relevant infrastructure and facilities.

59. **Policies triggered and instruments.** Without physical displacement, the project will only acquire some land for construction of infrastructure and facilities; the OP 4.12 on Involuntary Resettlement, therefore, is triggered. The project will possibly require land acquisition at 155 villages in 27 townships, with 231 mu permanent collective land acquisition and 418 mu state-owned land acquisition, and 900 mu land lease for project construction. About 753 households with 8,823 persons will be affected by land acquisition, among which 1,110 persons will permanently lose some land. The land acquisition ratio is less than 5 percent in each affected village because the project activities are relatively small-scale and there is flexibility in locating project sites. The restoration measures mainly include cash compensation to each affected household, plus training for the affected on resettlement policy, and improvement of farming skills. Vulnerable people will be provided with subsidies, CNY 100 per month, in the transition period. Further, there are eight linkage activities that have been identified as relating to the project. A due diligence review has been conducted on potential resettlement impacts. The review found that there are 550 households with 2,343 people affected by land acquisition of 504 mu; that all the affected have been fully paid, well compensated, and resettled in line with national land regulations; and that there are no pending issues or complaints.

60. The Resettlement Plans (RPs) were prepared in line with OP 4.12, including information disclosure and participation of the affected villagers, and domestic laws and regulations. These documents provide details on resettlement implementation procedures and requirements to be followed during project implementation, including compensation rates, mitigation measures to restore livelihoods, institutional and monitoring arrangements, and grievance redress mechanism. Resettlement budgets were determined and the PMOs have committed to fully finance the costs. The RP also include a grievance redress mechanism and internal and external resettlement monitoring arrangements.

61. Consultations with the seven project counties and the Provincial Minority Department concluded that there are no minority communities in or attached to the project areas. Also, other World Bank-financed projects in Jiangxi Province verified that there is no minority population around Poyang Lake. Thus, the project does not trigger the OP 4.10, Indigenous Peoples.

62. **Social Assessment (SA).** A full SA, especially on solid waste and wastewater collection activities, has been conducted around the project areas to: (a) investigate social economic baselines of the project areas; (b) understand the willingness of the beneficiaries to participate; (c) investigate gender issues and identify appropriate actions to address such issues; and (d) identify most appropriate implementation arrangements and specific mechanism, where needed, for proposed project activities. The results of the SA have been incorporated into project design when identifying priority activities and activity locations.

63. **Poverty issues.** The seven project counties have a population of 4.4 million, among which 0.39 million are poor, with a poverty ratio of 9 percent, based on the national poverty line, that is, annual income of CNY 2,800 per capita. Hence, the poor in the seven counties will also benefit directly or indirectly, including through provision of jobs during construction and operation of newly created assets.

64. **Gender.** There is strong evidence that gender inequalities contribute to poverty and reduce human well-being and that gender issues are an important dimension of the fight against poverty. The SA carried out during project preparation revealed that a higher share of women compared to men are involved in farming, forestry, stockbreeding, or fishery activities. Hence, the incentive mechanisms established for enhancing environmentally friendly farming and fishing practices will directly benefit women. The survey carried out as part of the SA indicates that a lesser share of female respondents in the project area carry out responsibility for wastewater disposal compared to men. However, this amounts to over a third of women being directly exposed to the health risks related to wastewater. Improving wastewater collection and disposal practices thus will benefit the health of the women, children, and the elderly that women are typically taking care of. The survey also revealed that women are predominantly more in charge of solid waste disposal; hence, the municipal solid waste collection improvements will directly benefit women population. Also, activities that will introduce new mechanisms in solid waste collection propose to specifically target women. The social gender action plan that has been developed as part of the SA, through an extensive process of consultation, also proposes a list of activities that are expected to increase environmental and health impact awareness and offer additional income earning opportunities.

65. **Participatory approach and local engagement.** The project involves a great number of communities, villages, farmer households, vulnerable groups, and agencies. To ensure project activities target the right beneficiaries, achieve project objectives, and realize sustainable operations, the project will engage with the public and adopt a participatory approach. A participatory manual, including public education on solid waste component, has been prepared to guide the project implementation.

66. **Consultations and participation.** The SA and the RP were developed through an extensive consultation and participation process. The stakeholders' concerns and needs were particularly discussed with the World Bank task team, the PMO, and the design institutes that prepared the Feasibility Study Reports (FSRs). These concerns were included into the FSRs and integrated in the project design, such as activity location selection to avoid or minimize resettlement and determination of prioritized activities by farmers. The participation process has been described in more detail in the SA.

67. **Information disclosure.** Relevant information on the project's social aspects was disseminated among the villages and communities during the SA and RP preparation. The SA and RP have been locally disclosed on August 31, 2016, on websites of provincial and county governments and local resettlement offices. The final English versions of the documents were disclosed by the World Bank on September 9, 2016.

68. **Capacity building and training**. The PPMO has managed several World Bank-financed projects and has experience on social safeguards aspects and satisfactory implementation. However, the CPMOs do not have such experience. The PPMO has assigned dedicated staff and arranged for facilities to be used to manage the social safeguard assignments; training will also be provided for the involved CPMO staff. An external social monitoring consultant will be engaged to monitor and guide the social safeguard activities.

F. Environment (including Safeguards)

69. The project is classified as a Category A project mainly because some project activities are in the vicinity of Poyang National Wetland Park and the project will support the cleanup of two polluted lakes. Applicable environmental safeguard policies for the project include Environmental Assessment (OP 4.01), Natural Habitats (OP 4.04), and Pest Management (OP 4.09). The Environmental Assessment (EA) concluded that major negative impacts are caused by construction; however, these can be effectively mitigated by the measures proposed in the Environmental and Social Management Plan (ESMP).

70. **Environmental Assessment (OP 4.01).** The EA was conducted for the project in accordance with applicable Chinese EA regulations and the World Bank's safeguards policies. The project will bring about overall environmental and social benefits, such as: (a) reducing pollution loads discharging into Poyang Lake; and (b) contributing to the improvement of living environment in the selected counties, thus benefitting local people. The project would also bring some adverse impacts, mainly including: (a) general construction nuisance; (b) construction impacts on the Poyang National Wetland Park due to project activities (that is, construction of facilities to treat nonpoint source pollution and installation of rural sewage treatment facilities in Poyang County); (c) sediment dredging impacts at Zoujiazui Lake in Duchang County and at the

outlet channel of Pipa Lake in Yugan County and the disposal of sediment (approximately total 13,000m^3); and (d) adverse impacts (for example, odor, dust, waste, noise) associated with domestic solid waste collection and transfer stations, sewage pipelines, and small-scale sewage treatment facilities in rural area during operation. The EA concluded that no major negative impacts are caused by construction and can be effectively mitigated by the measures proposed in the ESMP. As part of the EA process, due diligence for the existing WWTPs and SWTPs have been conducted, which confirms that operations of these WWTPs and SWTPs are in compliance with Chinese regulations. Cumulative impacts are not deemed relevant because most impacts of the project are construction-related impacts, which are short term, site specific, and limited and can be readily mitigated with the measures proposed in the ESMP.

71. An alternative analysis was considered for the investment components during the feasibility study and the EA to minimize environmental impacts. The EA and the feasibility study analyzed alternatives for wastewater collection and treatment options, solid waste collection and transfer options, sediment dredging options, 'without project' situation and confirmed the environmental sustainability of the selected activities.

72. Based on the EA, a stand-alone ESMP has been developed for each project county. The ESMPs specify mitigation and enhancement measures for the project activities, including the following: (a) Environmental Code of Practices for civil work contractors to be included into the bidding documents and civil work contracts; (b) specific mitigation measures to protect the Poyang National Wetland Park; (c) disposal of dredged sediments in an environmentally sound manner; (d) specific measures to mitigate impacts associated with domestic solid waste collection and transfer stations, sewage pipelines, and small-scale sewage treatment facilities; (e) mitigation measures for abnormal scenarios, such as leakage of sewers, and the measures for worker health and safety; and (f) social impact management measures. The ESMPs also propose mitigation measures, monitoring plan, capacity building and training activities, and the budget for the ESMP implementation.

73. **Natural Habitats (OP 4.04).** The project will finance small-scale wastewater treatment facilities at the existing 35 villages located in the vicinity of the Poyang National Wetland Park. To reduce the nonpoint source pollution, the project will build approximately 90 km bio-retention swales and constructed wetland around Zhuhu Lake, which is part of Poyang National Wetland Park and serves as a drinking water source for local people. In addition, the project will support the cleanup of Zoujiazui Lake. It is not expected that these activities would have the potential to cause significant conversion or degradation of natural habitats. Instead, these activities would reduce pollutant loads discharged into Poyang Lake and benefit this important natural habitat. OP 4.04 on Natural Habitats is triggered due to the changes in natural habitat. Mitigation measures to address the impacts of small-scale construction activities in the vicinity of protection areas have been proposed in the ESMP (see annex 3).

74. **Pest Management (OP 4.09).** The project will support training and studies for nonpoint source pollution management for agriculture activities, which may lead to the reduction of pesticides discharged into Poyang Lake. As such, this policy is triggered.

75. **Public consultations and information disclosure.** During the EA preparation, two rounds of public consultation were undertaken: the first round at the beginning of EA preparation

(EIA Terms of Reference [TOR]) starting in November 2015, and the second round in April 2016 after the first draft EA safeguards documents were prepared. Consultations were carried out through questionnaires, interviews and meetings with project affected people, experts, and government agencies. Main feedback and concerns from the public have been addressed in the project design and the ESMP's mitigation measures. In accordance with the World Bank's information disclosure policy, prior to project appraisal, the safeguards documents were locally disclosed at the local website and library with an announcement published at local newspaper on July 30, 2016. The safeguards documents were disclosed at the World Bank's external website on September 9, 2016.

VII. OTHER SAFEGUARDS POLICIES TRIGGERED (IF REQUIRED)

76. Not applicable.

VIII. WORLD BANK GRIEVANCE REDRESS

77. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

ANNEX 1: RESULTS FRAMEWORK AND MONITORING

CHINA: Poyang Lake Basin Town Water Environment Management Project

Project Development Objectives

PDO Statement

To reduce the pollutant discharge into selected waterways and improve management of water quality in selected counties in the Poyang Lake basin within Jiangxi Province.

These results are at	Project level

Project Development Objective Indicators

Indicator Name	**Baseline**	**Cumulative Target Values**					
		YR1	**YR2**	**YR3**	**YR4**	**YR5**	**End Target**
Direct project beneficiaries (Number) - (Core)	0	0	100,000	300,000	2,000,000	4,400,000	4,400,000
Female beneficiaries (Percentage - Subtype: Supplemental) - (Core)	0	0	50	50	50	50	50
Volume (mass) of COD pollution load reduction achieved under the project (Tons/year) - (Core)	0	0	0	90	1,350	2,700	2,700
Nutrient load reduction (Nitrogen [N]) achieved under the project (Tons/year) - (Core)	0	0	0	8	280	560	560
Nutrient load reduction (Phosphorus [P]) achieved under the project (Tons/year)	0	0	0	1	22	44	44
Industrial or municipal solid waste reduced or recycled under the project (Tons/year) - (Core)	0	0	25,000	55,000	62,000	99,000	99,000
Number of project counties that use participatory water quality management system	0	0	0	1	3	7	7
Lake Management Platform established and operational (Text)	No LMP	Users investigation and TOR drafted	TOR defined	Setup LMP	LMP trial	LMP operational	LMP operational

Intermediate Results Indicators

Indicator Name	Baseline	Cumulative Target Values					
		YR1	YR2	YR3	YR4	YR5	End Target
Newly established water quality monitoring stations/sites	0	0	4	16	29	44	44
Two-thirds of the Zhuhu (Pearl) Lake catchment area's point and nonpoint sources covered by appropriate pollution control and treatment (Text)	0	0	0	0	1/3 of critical catchment area	2/3 of critical catchment area	2/3 of critical catchment area
New household sewer connections constructed under the project (Number) - urban	0	0	2,000	8,000	20,000	36,000	36,000
New household sewer connections constructed under the project (Number) - rural	0	0	0	0	6,000	13,000	13,000
Volume (mass) of BOD pollution load removed by treatment plant under the project (Tons/year) - (Core)	0	0	0	70	400	800	800
Volume of sewage decreased to Poyang Lake (million m^3/year)	0	0	0	0.5	5	10.5	10.5
The number of new developed solid waste collection stations/sites	0	0	130	340	740	1,200	1,200
Solid waste collection rate (Percentage)	51	51	51	60	75	80	80
Number of people trained for public participation (Number)	0	20,000	40,000	50,000	70,000	90,000	90,000
Number of people participated in domestic and international training and study tour for project implementation (Number)	0	150	380	600	760	920	920

.

Indicator Description

Project Development Objective Indicators

Indicator Name	Description (indicator definition)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Direct project beneficiaries	Direct beneficiaries are people or groups who directly derive benefits from an intervention (that is, families that have a new piped water or sewer connection).	Semiannual	Project and activity reports	PMOs, PPMO
Female beneficiaries	Based on the assessment and definition of direct project beneficiaries, specify what percentage of the beneficiaries are female.	Semiannual	Project and activity reports	PMOs, PPMO
Volume (mass) of COD pollution load reduction achieved under the project	This indicator measures the volume (mass) of COD pollution load reduction achieved through process modification to reduce the load of pollutants requiring treatment and/or through application of wastewater treatment techniques to reduce the load of contaminants before discharge.	Semiannual	Project and activity reports; data as derived from water quality monitoring system	PMOs, PPMO
Nutrient load reduction (Nitrogen [N]) achieved under the project	This indicator measures nitrogen load reduction due to investments or efficiency gains (for example, manure management in livestock farms, optimization of use of fertilizer) financed under the project.	Semiannual	Project and activity reports; data derived from water quality monitoring system	PPMO, PMOs
Nutrient load reduction (Phosphorus [P]) achieved under the project	This indicator measures phosphorus load reduction due to investments or efficiency gains (for example, manure management in livestock farms, optimization of use of fertilizer) financed under the project.	Semiannual	Project and activity reports; data derived from water quality monitoring system	PPMO, PMOs
Industrial or municipal solid waste reduced or recycled under the project	Since the project will address domestic solid waste collection, this indicator measures the volume of domestic solid waste that is not generated and/or that is recycled as a result of the project.	Semiannual	Project and activity reports	PMOs, PPMO
Number of project counties that use participatory water quality management system	The participatory water quality management system as defined and described in the Participatory Manual and captures information disclosure, and citizen engagement and participation in the decision-making and project activities.	Semiannual	Project and activity reports	PMOs, PPMO
Lake Management Platform established and operational	This indicator will measure progress toward establishment of the LMP.	Semiannual	Project and activity reports	PMOs, PPMO

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Intermediate Results Indicators

Indicator Name	Description (indicator definition)	Frequency	Data Source/Methodology	Responsibility for Data Collection
Newly established water quality monitoring stations/sites	This indicator will measure the progress toward establishment of the water quality monitoring stations/sites in the project counties.	Semiannual	Project and activity reports	PMOs, PPMO
Two-thirds of the Zhuhu (Pearl) Lake catchment area's point and nonpoint sources covered by appropriate pollution control and treatment	The appropriate pollution control and treatment measures include farmland practices (use of fertilizer and pesticides and manure management practices), farmhouse wastewater collection and treatment, and constructed wetlands and bio-retention trenches/swales for pollution associated with storm runoff.	Semiannual	Project and activity reports; data as derived from the monitoring systems	Poyang CPMO, PPMO
New household sewer connections constructed under the project - urban	This indicator is measured as the cumulative number of new sewer connections constructed under the project for urban areas. The baseline value is expected to be zero.	Semiannual	Project and activity reports	PMOs, PPMO
New household sewer connections constructed under the project - rural	This indicator is measured as the cumulative number of new sewer connections constructed under the project for rural areas. The baseline value is expected to be zero.	Semiannual	Project and activity reports	PMOs, PPMO
Volume (mass) of BOD pollution load removed by the treatment plant under the project	This indicator measures the cumulative volume (mass) of BOD pollution loads removed by the treatment plant supported under the project. Project support can include construction, expansion, or rehabilitation of the treatment plant. The baseline value will be zero in places where wastewater treatment has not yet been made available. In cases where wastewater treatment has been available but is to be improved under the project, either with higher levels of treatment or rehabilitation of the existing treatment capacity, the baseline value will not be zero.	Semiannual	Project and activity reports; data as derived from the monitoring systems	PMOs, PPMO
Volume of sewage decreased to Poyang Lake (million m^3/year)	This indicator measures the cumulative volume of sewage decreased to Poyang Lake.	Semiannual	Project and activity reports; data as derived from the monitoring systems	PMOs, PPMO

The number of new developed solid waste collection stations/sites	This indicator measures the number of solid waste collection stations/sites constructed under the project.	Semiannual	Project and activity reports; data as derived from the monitoring systems	PMOs, PPMO
Solid waste collection rate	This indicator measures solid waste collection coverage (that is, household coverage) in town and villages covered by solid waste management activities under the project.	Semiannual	Project and activity reports; data as derived from the monitoring systems	PMOs, PPMO
Number of people trained for public participation (Number)	This indicator measures total numbers of people trained in participatory water environment management training, technical training related to project activities.	Semiannual	Project and activity reports	PMOs, PPMO
Number of people participated in domestic and international training and study tour for project implementation (Number)	This indicator accounts for the number of people trained through participation of domestic and international training and study tour for project implementation.	Semiannual	Project and activity reports; data as derived from the monitoring systems	PMOs, PPMO

ANNEX 2: DETAILED PROJECT DESCRIPTION

CHINA: Poyang Lake Basin Town Water Environment Management Project

1. The Jiangxi Provincial Government proposes to utilize the World Bank loan in managing the water environment in the key towns of the Poyang Lake basin. Seven counties—Duchang, Poyang, Yugan, Jishui, Fengxin, Jing'an, and Shangli—have been selected for project implementation. These seven counties represent a mixed pattern of geographic distribution across the basin: three counties are in close proximity to the main lake, one county along the mid-stream of a main river draining into the lake, two counties are adjacent to the tributary streams of a main river, and one county at the remotest distance from the lake. The water quality of Poyang Lake is closely associated with the environment of the water and land bodies in these contributing catchments, and vice versa.

2. The project is designed to integrate different methods of environmental protection to improve the water quality of the Poyang Lake Basin, including by means of wastewater treatment and solid waste management, as well nonstructural measures, including TA, establishment of the LMP. As such, the project will not only focus on engineering aspects but also on enhancing institutional mechanisms and improving O&M and monitoring systems to help the selected counties in Jiangxi Province to enhance water environmental services.

3. The project is being designed based on the concept of (a) accurately identifying and analyzing the problems and their systematical resolution; (b) applying integrated and participatory approach for sustainability of environmental management; (c) combining investment and institutional capacity-building measures; and (d) introducing technical and management innovation, building on lessons learned from World Bank-financed projects and others. The project will focus on investments to improve the wastewater collection and treatment systems, in both urban and rural areas, solid waste collection and treatment schemes, and river/lake environment restoration, in addition to institutional measures for broader water management in the Lake basin. The project design adopts an integrated approach involving relatively complex solutions, including structural and nonstructural measures.

4. Proposed project activities have been selected based on the following criteria: (a) cost-effectiveness; (b) subprojects should not cause any negative social and environmental impacts that cannot be mitigated; (c) subprojects must be in compliance with government development plans; (d) all land used for construction purposes shall conform to general land utilization plans of the cities and/or townships and their annual land use plans; (e) proposed interventions should solve existing problems comprehensively rather than providing partial solution; and (f) subprojects should have demonstration value. Based on these considerations, the selected main project activities are all government priorities and contribute to wholly solution for local challenges; and the project is designed along four main components.

Component 1: Institutional Strengthening for Water Management (with base cost of US$24.69 million)

5. This component will improve integrated water environment management and promote sustainable O&M of environment management facilities. The component will finance capacity building, policy and regulation enforcement, and improvement of participatory sustainable wastewater and solid waste management. The key activities would include the following:

(a) **Establishment of the LMP designed to strengthen the Poyang Lake basin's management, institutional, and knowledge sharing architecture.** The objective of LMP is to facilitate an efficient institutional framework and information sharing that ensures sound coordination among all affiliated agencies and stakeholders involved in managing the lake's water environment. The platform would (i) manage data sharing architecture and facilities to enable agencies and the public to monitor the lake basin and decide on effective actions; (ii) facilitate proper consultation; (iii) develop a participatory implementation and monitoring plan based on the situation in Poyang Lake; (iv) potentially assume responsibility for identifying water quality hotspots and assessing implications of development proposals in the basin on the lake water quality; (v) eventually facilitate the exchange of knowledge among other lake initiatives within China, including international best practices; and (vi) serve as a mechanism to build partnerships in a broader way in the country and beyond. The LMP will operate by closely involving representatives of relevant provincial and county governments, as well as concerned citizens and academic or research agencies. Given the importance of such a platform, functionality and institutional arrangements in the Poyang Lake basin case will be designed in detail as part of project implementation at its early stage, taking into account best international practices, yet considering local conditions and aspirations. Current institutional architecture, which includes a new established "River Head System"— leader of the party as a 'river head', the mayor of the county as 'river implementer' and a high level leading group for strategic orientation and guidance', will be the likely basis for such a platform.

(b) **Establishment of water environment monitoring systems**, through installation of monitoring stations, provision of monitoring equipment and facilities as well as establishment of integrated information monitoring system and early warning system; the water environment monitoring systems will serve for both government decision making for integrated water environment management and public awareness of environmental protection.

(c) **Carrying out of studies on financing and investment mechanisms for water environment management.** The studies would particularly focus on strengthening incentive mechanisms, including financial incentives/subsidy schemes to encourage farmers/fisherman to adopt agriculture/aquaculture good practices to reduce the nonpoint source pollution and other compensation/penalty schemes for ecological protection of Poyang Lake. The lake management incentives schemes will be set up at the county level.

(d) **Supporting an integrated vulnerability and sensitivity assessment of Poyang Lake.** This would strengthen basin-wide water environment management planning through evaluation of water quality improvement and protection, water quantity management, land use changes, biodiversity conservation, urbanization and demographic changes, tourism impact and industrialization, basin pollution, along with climate resilience and adaptation measures.

(e) **Enhancement of participatory sustainable lake basin management.** This would include (i) translating and disclosing to grassroots level organizations information on Poyang Lake protection; (ii) provision of training on water environment management to personnel of organizations responsible for water environment monitoring and enforcement; and (iii) ensuring soundness of infrastructure design and O&M sustainability, through promotion of environmental protection, rich and diversified social activities, training, and establishment of environmental management mechanism at county and village levels.

Component 2: Lake and River Restoration and Improvement of Wastewater Management (US$139.43 million)

6. This component will finance activities related to the lake restoration and wastewater management in selected counties in the Poyang Lake basin. The flood management requirement for project activities are considered during project design based on relevant national flood management codes. The main activities include the following:

(a) **Restoration of lake and river environment.** This subcomponent will finance implementation of integrated engineering and biological mitigation measures in selected small lakes, rivers, and catchments in the Poyang Lake basin. This includes restoration of water environment in Zhuhu Lake in Poyang County and Pipa Lake in Yugan County and ecological restoration of the Zoujiazui Lake stream corridor in Duchang County. Key activities would include (i) construction of about 95.9 km of bio-retention swales to intercept the runoff pollutants from being discharged directly into the lakes and development of about 78 constructed wetlands to further remove pollutants from storm water to be discharged into the Zhuhu Lake in Poyang County; (ii) construction of 92.5 km of sewer interceptors and one 40 L/s small pump station to divert the wastewater from being discharged into the lake; (iii) removal of a small amount of lake sediment to reduce the inner lake pollution source; (iv) restoration of water diversion structures (construction and upgrade of four gates and one pump station) and other restoration measures such as constructed wetland and vegetative shoreline stabilization works in Pipa Lake in Yugan County, and restoration of 13 ha lake area and 3 ha of wetland in Zoujiazui Lake in Duchang County; and (v) 'nonstructural' measures, including introduction and coordination of best farmland practice/regulations, and sound aquaculture practices.

(b) **Enhancement of wastewater management.** This subcomponent will finance rehabilitation and expansion of urban wastewater collection and rural wastewater collection and treatment to improve capacity of wastewater collection of selected counties. Main activities will include (i) construction of about 23 km wastewater interceptors/collections and about 19 km storm water pipelines, as well as associated restoration of about 7 km roads and upgrade of about 1 km irrigation/drainage canals, in Fengxin County; (ii) construction of 11.4 km wastewater interceptors/collections and 8 km storm water pipelines, as well as an upgrade of a 15 m drainage culvert, in Duchang County; (iii) construction of about 30 km wastewater interceptors/collections and 17 km storm water pipeline in Jing'an County; (iv) construction of about 30 km wastewater interceptors/collections and 15 km storm water pipelines, as well as construction and improvement of four small

sewer pump stations, in Jishui County; and (v) construction of 87 km of rural wastewater collection and 35 villages wastewater treatment facilities, as well as household connections to sewers, in Poyang County.

Component 3: Improvement of solid waste management (US$27.68 million)

7. This component will improve solid waste collection and transportation systems in rural and urban areas of Duchang, Yugan, Jing'an, and Shangli Counties, to reduce solid waste disposal to lake/river systems of the Poyang Lake Basin. The main activities include (a) provision of residential and institutional solid waste bins and construction of solid waste collection stations (a total number of about 24,000); (b) provision of solid waste collection and transportation vehicles (a total number of about 101); (c) construction of nine solid waste transfer stations; and (d) installation of local solid waste management information systems in Shangli, Duchang, and Jing'an Counties. The solid waste collection and transportation system will connect to existing SWTPs in the four counties.

(a) **Shangli County.** In six townships of Shangli County, investment would be made for installation of 120 solid waste collection stations, six solid waste transfer stations, purchase of 22 waste collection vehicles, nine solid waste transport trucks, eight street sweepers, eight street washing trucks, and eight suction trucks, and a solid waste management information system covering all townships (10 townships) in Shangli.

(b) **Duchang County.** In three townships of Duchang County, investment would be made for the gear of sanitary workers (total of 26 sets), 785 concrete waste collection tanks, 1,568 waste bins, 17 waste collection vehicles, six recyclable waste collection vehicles, three waste transfer stations, three solid waste transport trucks, and a solid waste management information system.

(c) **Yugan County.** The solid waste investment in Yugan County is to be made to improve the solid waste management service quality along a local lakeshore—Pipa Lake. The investment will be used for procurement of 349 waste bins, four waste collection vehicles, two sprinkling trucks, two street sweepers, five compressed waste transport trucks and two solid waste collection stations.

(d) **Jing'an County.** The solid waste investment in Jing'an County is to upgrade the existing solid waste management system in its central urban area. The investment would be used for gear of sanitary workers (total of 7 sets), 1,620 waste bins, one waste collection vehicle, four tricycles with buckets, upgrade of two solid waste collection stations, two compressed waste collection vehicles, and installation of a solid waste management information system.

Component 4: Project Implementation Support (US$5.55 million)

8. This component will support the overall capacity of the Project Implementing Entity to coordinate, manage, and supervise the implementation of the project, including (a) provision of consulting services to enhance engineering design, construction supervision, and environmental and social management; (b) carrying out of capacity-building activities through workshops, training and study tours; (c) carrying out of FM, procurement, contract supervision, and M&E,

including procurement of external social, resettlement and environmental monitoring services; and (d) the operation of PMOs (including the purchase of office equipment). (Project cost by county is listed below).

Table 2.1. Project Cost and Financing Plan by County (US$, millions)

No.	Component	Duchang	Poyang	Yugan	Jing'an	Fengxin	Jishui	Shangli	PPMO	Subtotal
A	**Institutional Strengthening for Water Management**	2.47	4.18	2.20	5.47	2.77	2.92	4.18	0.50	24.690
1	Establishment of Lake Management Platform	0.10	0.10	0.10	0.10	0.10			0.00	0.700
2	Establishment of water environment monitoring systems	1.91	2.21	1.73	4.97	2.25	2.47	0.95	0.06	16.550
3	Preparation of studies related to ecological protection of Poyang Lake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.070
4	Preparation of vulnerability assessment of Poyang Lake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.350
5	Enhancement of participatory sustainable lake basin management	0.46	1.87	0.37	0.40	0.42	0.35	3.13	0.02	7.020
B.	**Lake and River Restoration and Improvement of Wastewater Management**	17.65	35.85	27.61	14.36	23.48	20.47	0.00	0.00	139.420
1	Restoration of lake and river environment	7.16	19.08	27.61	0.00	0.00	0.00	0.00	0.00	53.850
2	Enhancement of wastewater management system	10.49	16.77	0.00	14.36	23.48	20.47	0.00	0.00	85.570
C	**Improvements in Solid Waste Management**	2.94	0.00	0.61	1.39	0.00	0.00	22.74	0.00	27.680
D	**Project Implementation Support**	0.58	0.78	0.68	0.53	0.57	0.53	0.58	1.30	5.550
	Baseline Costs	23.64	40.81	31.10	21.75	26.82	23.92	27.50	1.80	197.340
	Contingencies	1.65	2.87	2.26	1.26	1.88	1.64	1.82	0.00	13.380
	Total Project Cost	25.29	43.68	33.36	23.01	28.70	25.56	29.32	1.80	210.720
	Interest During Implementation	1.00	1.46	1.34	0.88	0.97	0.88	1.60	0.00	8.130
	Front-end Fee	0.05	0.09	0.06	0.04	0.05	0.04	0.05	0.00	0.380

No.	Component	Duchang	Poyang	Yugan	Jing'an	Fengxin	Jishui	Shangli	PPMO	Subtotal
	Commitment Fee	0.10	0.14	0.13	0.09	0.05	0.09	0.10	0.00	0.700
	Total Financing Required	26.44	45.37	34.89	24.02	29.77	26.57	31.07	1.80	219.930

ANNEX 3: IMPLEMENTATION ARRANGEMENTS

CHINA: Poyang Lake Basin Town Water Environment Management Project

Project Institutional and Implementation Arrangements

1. **Current institutional setup of Poyang Lake management.** Under the GoJ, there are nine provincial government agencies managing Poyang Lake affairs. These include the PDRC, PDOF, PDWR, PDEP, Department of Forestry, Department of Agriculture, Department of Communication, Department of Sanitation, and Bureau of National Land Resources. All of these government agencies have assigned functions and responsibilities. For example, the PDRC is in charge of planning and programming, the PDOF—in charge of financial support and budget allocation, the PDWR—in charge of water resources planning and implementation, and the PDEP—in charge of environmental planning and implementation. However, some of the functions overlap are not well defined, such as water planning, environmental monitoring, management responsibilities which lead to weak integrated water environment management planning and weak policy enforcement of water environmental management policies.

2. **River Head System (RHS).** On November 1, 2015, the GoJ officially issued an 'Implementation Plan for River Head System of Jiangxi Province' (document no. 50), setting up an RHS in the Jiangxi Province. The RHS has been established as a long-term sustainable mechanism for integrated, cooperative, and participatory river and lake management. Key government leaders of the province, cities, counties, townships and villages serve as the heads and deputy heads of rivers and lakes in their respective territories. The provincial party secretary serves as the general head and governor as the vice general head. The head of Poyang Lake is the vice governor in charge of agricultural, forestry and water affairs. The Provincial RHS Office has been established and is located at the PDWR, with representatives from all relevant government agencies. The system requires the river heads and deputy heads to take up the responsibilities of river and lake management, and the RHS office to coordinate with the nine government agencies. While the outcomes of the RHS are yet to be assessed, its concept is in line with the GoJ's efforts toward an integrated water resources management approach. The RHS could eventually evolve into the proposed LMP as well as have a mandate to coordinate setup of water quality monitoring network.

3. **General arrangements and PLG.** The Jiangxi Provincial Government has several ongoing projects financed by the World Bank. The implementation arrangements at the provincial level are the same as those for the ongoing Jiangxi Small Town Project. The provincial government will be the borrower of the World Bank's loan proceeds while the PPMO, under the PDRC of the Foreign Investment Management Office, will be responsible for the overall project preparation and implementation in close coordination with the seven participating project counties.

4. Approved by the provincial government, the PPSC also known as the PLG is established, chaired by the PDRC, members comprising Provincial Finance Department, Provincial Department of Housing and Urban—Rural Development, Provincial Department of Land and Resources, PDEP and Provincial Department of Water Resources. The main functions of the

PLG are to (a) provide policy direction and strategic guidance for project preparation and implementation and (b) coordinate and make decisions on key project issues, including land-related issues, project changes, and counterpart funding.

5. **Project management and coordination.** The PPMO has long experience in executing World Bank and ADB-financed projects. Project expert teams are to be established under the PPMO, made up of suitable experts to provide technical guidance at each level. The PPMO (see figure 3.1) is composed of three functioning departments for different aspects of project implementation, including FM, procurement, and comprehensive management (engineering, social safeguard, and coordination and liaison). The major responsibilities of the PPMO include (a) supervising the loan and project implementation; (b) coordinating with the provincial and county governments and the World Bank as a focal point; (c) project planning for annual implementation and fund requirements and approval of required documents; (d) procuring and recruiting for all civil works, goods packages, and consultants services with technical assistance from the implementation agencies; (e) organizing design reviews, providing overall implementation supervisions, and participating in project completion acceptance; (f) managing FM, including the project fund and preparing loan withdrawal applications with support from the implementation agencies; (g) overseeing the implementation of the RPF, RP, and ESMP; (h) establishing and implementing project M&E, covering project results monitoring, specialized technical monitoring, and safeguards monitoring; (i) implementing institutional capacity-building programs; and (j) preparing and consolidating all reports required by the World Bank with assistance from the CPMOs and implementation agencies.

6. At the county level, CPMOs have been established (mirroring the PPMO) with members comprising seconded staff from relevant government agencies (including Water, Environmental Protection, Housing and Urban Development, Ecological Civilization, Development and Reform Commission, Finance, Forestry, Land Resources and Management, and Planning). The CPMOs are headed by the respective counties head of the DRC and the county-level PLGs by deputy executive county mayors. The key responsibilities of the CPMOs are similar to the PPMO's major responsibilities stated above and are done at the county levels except for items (b) and (d). This kind of project coordination is normal in China and effective based on previous project experience.

7. During the initial phase of the proposed LMP, the PPMO will be responsible for collecting and analyzing the information from the project with inputs from the CPMOs and an expert group. These processed information will then be reported to the provincial RHS to provide decision support for day-to-day operations and emergency response.

8. **Project implementation.** The project is composed of many subprojects, which will be implemented mainly by the CPMOs and other implementing agencies supported by PPMO and expert teams, and guided by PLGs. Table 3.1 provides an overview of the detailed project implementation per activity.

Figure 3.1. Poyang Lake Basin Town Water Environment Management Project

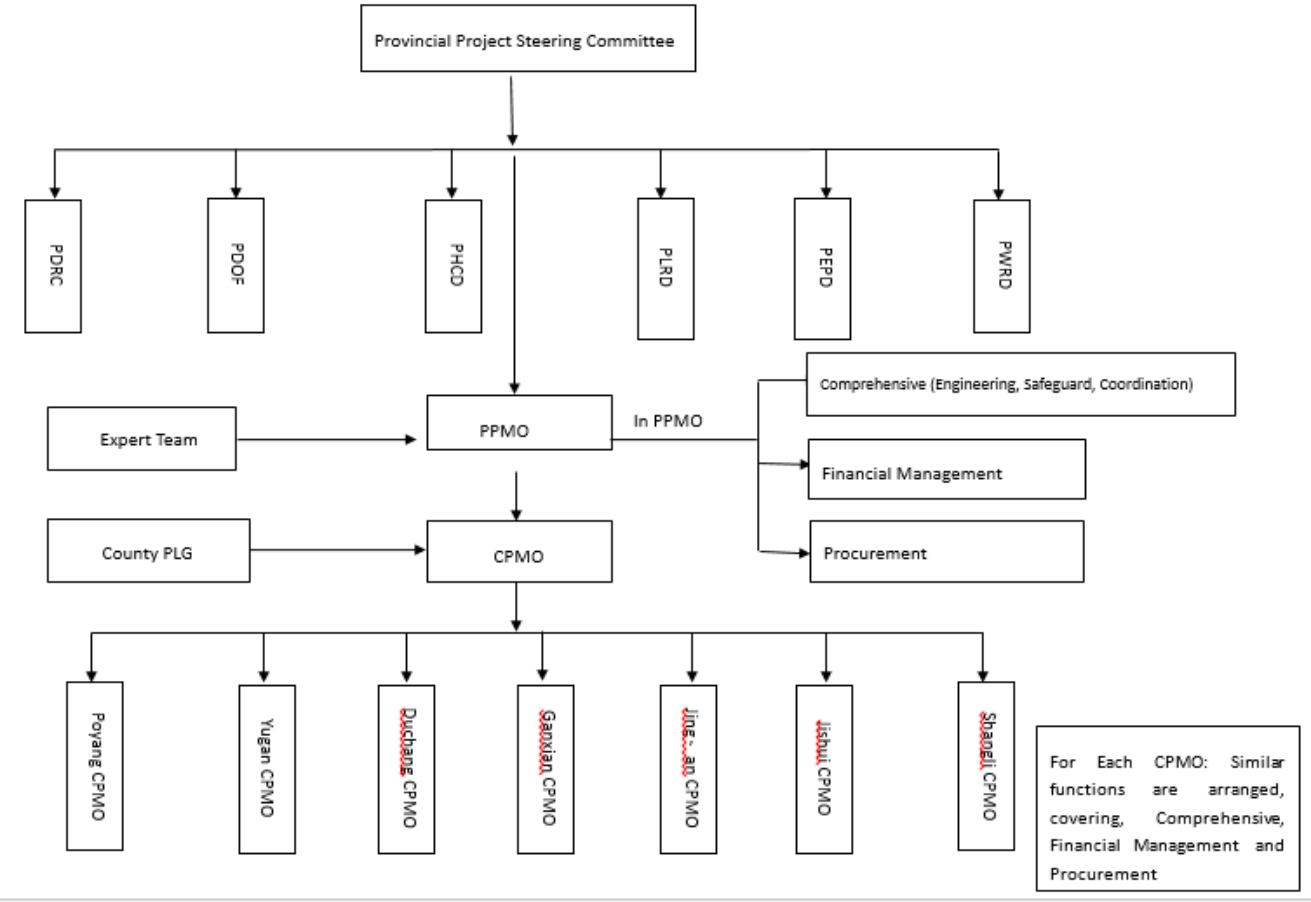

Table 3.1. Summary of Project Activities and Responsible Agencies

No.	Project Activities	Procurement & FM	Implementing Agency	O&M Unit
I	**Component 1: Institutional Strengthening for Water Management**			
1.	Establishment of the LMP	PPMO	PPMO, CPMOs	PPMO
2.	Establishment of water environment monitoring systems	PPMO	PPMO	7 CPMOs
3.	Preparation of studies related to ecological protection of Poyang Lake	PPMO	PPMO	PPMO
4.	Preparation of sensitivity assessment of Poyang Lake	PPMO	PPMO	PPMO
5.	Enhancement of participatory sustainable lake basin management	PPMO, CPMOs	7 CPMOs	7 CPMOs
II	**Component 2: Lake and River Restoration and Improvement of Wastewater Management**			
1	*Restoration of lake and river environment*			
1.1	Water environment restoration of Zhuhu Lake, Poyang County.	PPMO and CPMO	Poyang CPMO	Poyang Wetland Park Management Committee

No.	Project Activities	Procurement & FM	Implementing Agency	O&M Unit
1.2	Water environment restoration of Pipa Lake, Yugan County.	PPMO and CPMO	Yugan CPMO	Yugan Aquatic Product Bureau
1.3	Water environment restoration of Zoujiazui Lake, Duchang County	PPMO and CPMO	Duchang CPMO	Duchang Construction Bureau
2	*Enhancement of wastewater management*			
2.1	Rural domestic sewage collection network, Poyang County	PPMO and CPMO	Poyang CPMO	PPMO and CPMO
2.2	Urban sewerage collection network, Fengxin County	PPMO and CPMO	Fengxin CPMO	Fengxin Construction Bureau
2.3	Urban sewerage collection network, Duchang County	PPMO and CPMO	Duchang CPMO	Duchang Construction Bureau
2.4	Urban sewerage collection network, Jing'an County	PPMO and CPMO	Jing'an CPMO	Jing'an Urban Administration Bureau
2.5	Urban Sewerage Collection Network, Jishui County	PPMO and CPMO	Jishui CPMO	Jishui Urban Administration Bureau
III	**Component 3: Improvements in Solid Waste Management**			
1.	Solid waste collection and transportation system in Pipa Lake area, Yugan County	PPMO and CPMO	Yugan CPMO	Yugan Urban Administration Bureau
2.	Solid waste collection and transportation system, Shangli County	PPMO and CPMO	Shangli CPMO	Shangli Agriculture and Industry Department
3.	Solid waste collection and transportation system in 3 townships, Duchang County	PPMO and CPMO	Duchang CPMO	Duchang Urban Administration Bureau
4.	Solid waste collection and transportation system in 3 townships, Jing'an County	PPMO and CPMO	Jing'an CPMO	Jing'an Urban Administration Bureau
IV	**Component 4: Project Implementation Support**			
1.	Provision of consulting services.	PPMO and CPMOs	PPMO and CPMOs	PPMO and CPMOs
2.	Carrying out of capacity building activities through workshops, training and study tours	PPMO and CPMOs	PPMO and CPMOs	PPMO and CPMOs
3.	Carrying out of FM, procurement, contract supervision and M&E	PPMO and CPMOs	PPMO and CPMOs	PPMO and CPMOs
4.	Operation of PMOs	PPMO and CPMOs	PPMO and CPMOs	PPMO and CPMOs

Financial Management, Disbursements and Procurement

Financial Management

9. The FM capacity assessment conducted in December 2015 and May 2016 identified the following principal risks: (a) most project counties do not have experience with World Bank-

financed projects and (b) the required MIS data of the ongoing project was not entered by CPMOs on time so that the system could not be used efficiently to monitor project progress.

10. Mitigation measures, to address the above risks, which have been agreed include (a) FM training (formal and ad hoc) to be provided to the project financial staff by the PPMO, JPFB, and the World Bank; (b) issuing an FM Manual to standardize project FM procedures and provide guidance to FM staff; (c) and close monitoring and guidance from the PPMO and the World Bank's supervision to ensure the MIS works efficiently.

11. The World Bank loan will be signed between the World Bank and China through its MOF. Since all project counties are financially managed by provincial government directly, on-lending arrangements for the World Bank loan will be signed between China through its MOF and the Jiangxi Provincial Government through the JPFB, then between the JPFB and county government through county finance bureaus. Loan repayment will be borne by the county government.

12. Overall, the residual FM risk for the project is assessed as Moderate.

13. **Budgeting**. The annual PIP, including the funding budget and the resources, will be prepared by the CPMOs and entered in the MIS once the plan is approved by the PPMO. The budget for counterpart funds committed by the local government will be reviewed and approved by the local People's Congress and be included in their annual budget. Based on the approved budget and implementation progress, the related government will provide government appropriations to the project. Although the World Bank loan is not included in the government budgeting system, the loan proceeds will be managed though government treasury system in the form of a special account. Budget variance analysis will be conducted on a semiannual basis by related PMOs using the data generated by the MIS and necessary actions will be taken to ensure that the project is implemented as planned. The World Bank will work with the PPMO and CPMOs through supervising a project annual plan to enhance their budget preparation and execution during project implementation.

14. **Funds flow.** The World Bank loan proceeds will flow from the World Bank into the project DA to be set up at and managed by the treasury division of the JPFB in the form of a finance special account. The JPFB will be directly responsible for the management, maintenance, and reconciliation of the DA activities. Supporting documents requesting for payment will be prepared and submitted by the CPMOs to the PPMO for review and verification through the county finance bureau before sending to the JPFB for further disbursement processing. The requested funds will be delivered to the county finance bureaus directly from the DA so that the county finance bureaus can pay the contractors/suppliers on time. The JPFB will pay the contractors/suppliers directly for those activities implemented by the PPMO. The counterpart funds will be paid to the contractors/suppliers by the county finance bureaus according to related domestic regulations and procedures.

15. **Accounting and financial reporting**. The administration, accounting, and reporting of the project will be set up in accordance with 'Circular 13: Accounting Regulations for World Bank-financed Projects' issued in January 2000 by the MOF.

16. The CPMO and PPMO will be managing, monitoring, and maintaining their project accounting records for the activities they execute. Original supporting documents will be retained by the PPMO and county PMOs, respectively. All PMOs will use the PROMIS system to account for project activities and prepare financial reports. Project financial statements will be consolidated by the system automatically. The unaudited semiannual project interim financial reports (format and content) in accordance with the aforementioned Circular 13 agreed with the MOF will be prepared and furnished to the World Bank by the PPMO no later than 60 days following each semester, in form and substance satisfactory to the World Bank.

17. **Internal control.** The related accounting policy, procedures and regulations were issued by the MOF to uniformly align the FM and disbursement requirements for World Bank-financed projects. Additionally, the PIP (with one annex on project FM) aligns the entire project FM policies and procedures among PMOs, which can serve for the project implementation and management. There is no internal audit function to be set up during the project implementation period, however, the county finance bureaus will supervise project progress regularly.

18. Following the good practice of the ongoing project executed by the PPMO, the proposed new project will also use the PROMIS system to monitor the whole process of project implementation. The PPMO was required to provide more training and guidance to CPMOs before project implementation and strengthen its supervision on data entry to ensure the system could be used as an efficient tool to monitor and manage project activities.

19. **Implementation arrangements for activities that use participatory approach.** Given the various activities that will be implemented under the public participation approach, the tailored procedures are proposed to ensure that the activities can be implemented efficiently. The details are as the follows:

(a) The training at the county level, the consulting services on participation approach, and internet and TV publicity will be implemented by CPMOs by following traditional procurement and FM procedures and requirements.

(b) The activities to be implemented by the community include training and environmental dissemination at the community level, establishment of village environmental protection mechanism, and improvement of village waste collection systems. Since some goods will be procured under the waste collection system, the World Bank's community participation procurement method will be adopted and the payment will be made based on the actual expenditures incurred.

(c) For the remaining activities, the CPMO will sign an implementing agreement with the community by using the output-based disbursement method. The agreement should at least include (i) activities to be implemented, (ii) required technical criteria, (iii) the responsibility of each party, (iv) the total amount, (v) terms of payment, (vi) verification procedures, and (vii) disclosure requirement.

(d) After the community completes the required activities, the CPMO will carry out its verification according to related items of the agreement. A certificate will be issued by the CPMO if the activities are satisfactory. Such a certificate will be the only

supporting document for both disbursement and accounting purposes.

(e) The CPMO will hire some students and investigators to conduct farmers' interview and survey according to the procedures and requirements stated in the public participation manual. The payment will be made based on the number of working days and the unit cost stipulated by the PPMO.

(f) The CPMO will sign an agreement with the river head office for the billboard for environmental protection. The content is similar to that signed with the community. The CPMO will verify the work completed and make payment according to the terms stated in the agreement. The certificate issued by the CPMO will be the supporting document for both disbursement and accounting purposes.

20. Table 3.2 summarizes the abovementioned arrangement. A public participation manual, which is part of the PIP, has been prepared to standardize the procedures and provide detailed guidance to PMO staff.

Table 3.2. Implementation Arrangements for Activities Using Participatory Approach

Activity	Implementing Entity	Procurement Method	Remarks
Training at county level	CPMO	No	Traditional supporting documents will be submitted for disbursement.
Training and environmental dissemination at the community level, and the establishment of village environmental protection mechanism	Community	No	The CPMO signs an agreement with the community and the payment will be made based on the completed activities verified by the CPMO. The certificate issued by the CPMO will be the supporting document for both disbursement and accounting purposes.
Consulting services (including materials printing)	CPMO	World Bank's procurement requirement	Traditional supporting document will be submitted for disbursement.
Farmers' interview and survey	Students and investigators	No	The CPMO hires these people to conduct the required works and they will be paid based on the working days and the unit cost determined by provincial PMO
Billboard for environmental protection	River head office	No	The CPMO signs agreement with the office and the payment will be made based on the completed activities verified by the CPMO. The certificate issued by the CPMO will be the supporting document for both disbursement and accounting purposes.

Internet and TV publicity	CPMO	World Bank's procurement requirement (single source)	Traditional supporting documents will be submitted for disbursement.
Improvement of village waste collection system	Community	World Bank community participation procurement	Traditional supporting documents will be submitted for disbursement.

21. **Audit**. The Jiangxi Provincial Audit Office has been identified as the auditors for the project. Annual audit report will be issued by the audit office and will be due to the World Bank within six months after the end of each calendar year. Following the World Bank's formal receipt of the audited financial statements from the borrower, the World Bank will make them available to the public in accordance with the World Bank's Policy on Access to Information.

Disbursements

22. Three disbursement methods: advance, reimbursement, and direct payment are all available for the project. Supporting documents required for World Bank disbursement under different disbursement methods has been documented in the Disbursement Letter issued by the World Bank.

23. One DA in U.S. dollars will be opened at a commercial bank acceptable to the World Bank and will be managed by the treasury division of the JPFB. The ceiling of the DA has been determined and documented in the Disbursement Letter.

24. The World Bank loan will be disbursed against eligible expenditures (taxes inclusive) as given in table 3.3:

Table 3.3. Disbursement Categories

Disbursement Categories	**IBRD Loan**	
	Allocated Amount (US$)	**Percentage of Expenditures to be financed (percentage)**
Goods, works, non-consulting services, Output-based Payments, Incremental Operating Costs, Training and Workshops and consultants' services for the Project	149,625,000	100
Front-end fee	375,000	
Total	**150,000,000**	

25. The World Bank loan proceeds and counterpart funds will co-finance each component but for different activities and contracts. The main direct investments for infrastructure, goods, and capacity building will be 100 percent financed by the World Bank loan. All the World Bank-financed contracts and non-contracted activities will be included in the procurement and activity plans submitted by the PMO and approved by the World Bank. The general costs for design,

engineering supervision, external environmental and social monitoring, project management as well as land acquisition and resettlement will be financed 100 percent by counterpart funds.

Procurement

26. **Capacity assessment**. Procurement will be conducted by the Jiangxi PPMO with assistance from a procurement agent company to be selected. Most contracts will however be signed and executed by the PMOs in each county. An assessment of the capacity of the PMOs to implement procurement under the project has been carried out. The key risks identified are (a) possible delay in procurement caused by delay in completion of the detailed design and preparation of the technical specifications; (b) potential inconsistencies with the World Bank's procurement guidelines arising from insufficient experience of the CPMOs in World Bank-financed projects; (c) potential delay in procurement and implementation of the contracts caused by insufficient counterpart fund from the county governments; and (d) cost overrun and other variations during contract implementation arising from rough design and quantities in the bidding documents and change of master plan of the county governments. Suggested mitigation measures include (a) the counties should expedite the designs of relevant project components; (b) the bidding documents should be prepared based on the detailed design rather than the preliminary design; (c) the World Bank team will provide support to the PMOs in setting out appropriate procurement strategy and technical specifications and in handling special procurement arrangement if applicable; (d) the World Bank team will provide support in contract management at the post contract award stage to assist the PMOs in handling contract variations; and (e) the local government should secure the annual counterpart fund from its budget. The overall procurement risk is rated as Low.

27. **Applicable guidelines**. Procurement will be carried out in accordance with the World Bank's 'Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' dated January 2011 and revised in July 2014, 'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' dated January 2011 and revised in July 2014, and the provisions stipulated in the loan agreement and project agreement.

28. **Procurement of works and supply and installation of plant and equipment.** Procurement of works and supply and installation of equipment will be conducted using the World Bank's Standard Bidding Documents for all International Competitive Bidding (ICB) and model bidding documents for all National Competitive Bidding (NCB).

29. **Procurement of goods.** Procurement of goods will be conducted using the World Bank's Standard Bidding Documents for all ICB and model bidding documents for all NCB.

30. **Selection of consultants**. The World Bank's Standard Request for Proposals will be used for consultancy services costing more than US$300,000 or equivalent. Simplified Requests for Proposals will be used for services costing less than US$300,000.

31. **Procurement Plan.** A Procurement Plan for the whole project implementation period has been prepared by the PPMO. It has been made available on the World Bank's external website.

The Procurement Plan sets forth the thresholds for procurement methods and prior review. The Procurement Plan will be updated annually or as required to reflect implementation needs and improvements in institutional capacity.

32. **Frequency of procurement supervision.** In addition to prior review, the World Bank mission will also carry out at least one procurement supervision annually.

33. **Thresholds for procurement methods and prior review.** The maximum indicative thresholds, which can be applied are shown in table 3.4. The Procurement Plan will set forth the actual thresholds for procurement methods and prior review.

Table 3.4. Maximum Thresholds for Procurement Methods and Prior Review

Expenditure Category	Contract Value Threshold (US$)	Procurement/Selection Method	Prior Review Threshold (US$)[1]
1. Works and Supply and Installation of Plant and Equipment	—	ICB	All
	< 40,000,000 < 200,000	NCB Shopping	First NCB contract; all contracts ≥ 20,000,000
	—	Direct Contracting	All contracts ≥ 200,000
2. Goods and Non-Consulting Services	—	ICB	All
	<10,000,000	NCB	First NCB contract; all contracts ≥ 5,000,000
	<200,000	Shopping	
	—	Direct Contracting	All contracts ≥ 200,000
3. Consultant Services	—	QCBS/QBS	First contract; all contracts ≥ 2,000,000
	<300,000	CQS	First contract
	—	Individual Consultant	Only in exceptional cases
	—	Single-Source Selection (firm)	≥ 100,000
	—	Single-Source Selection (individual)	≥ 50,000

Note: [1]. A contract whose cost estimate was below the World Bank's prior review threshold is subject to prior review if the price of the lowest evaluated responsive bid (or, in the case of consulting services, the financial offer of the selected firm) exceeds such threshold at the bid/proposal evaluation stage. TORs for all firm and individual consultants shall be prior reviewed by the World Bank; [2]. The threshold for shortlisting comprising only national consultants: US$500,000. QCBS = Quality- and Cost-Based Selection; QBS = Quality-Based Selection.

34. **Advance contracting.** The Procurement Plan sets forth those contracts, which will be procured in advance together with the relevant World Bank review procedures.

Environmental and Social (including safeguards)

Social

35. The project aims to improve participatory management of, and reduce pollutant load to, selected water environment in Poyang Lake Basin, covering seven counties in five cities, and will bring positive social benefits and sustainable poverty reduction opportunities for the rural communities. The proposed project activities involve (a) wastewater treatment in some county towns, (b) solid waste collection and treatment, (c) water environmental improvement on some lakes and rivers, and (d) capacity building. The project will improve water environment, water quality, and sanitation in project towns and villages of the counties, and bring many social benefits for citizens with regard to health, living conditions, asset value and income opportunities. On the other hand, the potential adverse social impacts may relate to land acquisition and resettlement because of construction and/or operation of the relevant infrastructure and facilities.

36. **Policies triggered and instruments**. The project will both permanently and temporarily acquire some land for construction of infrastructure and facilities, OP 4.12, therefore, is triggered. An RP has been prepared for each county, and integrated into a comprehensive RP.

37. Consultations with the seven project counties and the Provincial Minority Department concluded that there are no minority villages/communities in or collectively attached to project areas. Other World Bank-financed projects in Jiangxi Province verified that there is no minority found around Poyang Lake. Therefore the project will not trigger OP 4.10, Indigenous People.

38. **OP 4.12.** Without physical displacement, the project will possibly result in land acquisition at 155 villages in 27 townships, with 231 mu permanent collective land acquisition and 418 mu state-owned land acquisition, as well as 900 mu land leasing for project construction. About 753 households with 8,823 persons will be affected by land acquisition, among which 1,110 persons will permanently lose some land. The land acquisition ratio is less than 5 percent in each affected village, because the project activities are small-scale and there is flexibility in locating project sites. The restoration measures mainly rely on cash compensation to each affected household, plus training. Vulnerable people (disabled or aged) will be provided with a subsidy of CNY 100 per month, during the transition period.

39. The RP has been prepared based on OP 4.12 information disclosure policy and participation of the affected villagers and domestic laws and regulations. These documents provide details on resettlement implementation procedures and requirements to be followed during project implementation, including compensation rates, mitigation measures to restore livelihoods, institutional and monitoring arrangements, and grievance redress mechanism. The tabulated resettlement budget was determined in the document and the cost will be fully financed by the PMO.

40. **Social Assessment (SA)**. A full SA, especially on social waste and wastewater collection, has been conducted around the project areas to (a) investigate social economic baselines of the project areas; (b) understand willingness of targeted beneficiaries to participate in the assessment; (c) investigate gender issues and identify appropriate actions to address such issues; and (d) identify most appropriate implementation arrangements and specific mechanisms where needed for proposed project activities. The results of the SA have been and will further be incorporated into the project design.

41. The SA and RP were prepared by the Jiangxi PPMO, reviewed by the World Bank, and were found compliant with the World Bank's requirements. The documents were locally disclosed on August 31, 2016 on local governments' websites, newspapers, and local resettlement offices; and disclosed by the World Bank on September 9, 2016. The PPMO will commit to further incorporate the SA findings in the project detailed design and monitor the social impacts.

42. Internal and external resettlement monitoring arrangements were developed and included in the RP. These cover the monitoring indicators, frequency, qualification of external resettlement monitoring agencies, and their roles.

43. **Consultations and participation**. The SA and the RP were developed through extensive consultation and participation process. The stakeholders' concerns and needs were discussed with the World Bank task team, the PMO, and the design institutes, and were incorporated in the project FSRs and integrated in the project design. The recommendations from the consultations have been reflected in the project design; and the detailed participation information has been described in the SA.

44. A grievance redress mechanism was designed as part of the RP, including a process and a grievance record table, in which grievances can be filed both orally and in writing. The process starts from village and neighborhood committee level, and can be elevated to county/district, city level if complainants are not satisfied with the resolution at the lower level. Complainants can also file their cases in court if they are not satisfied with the resolution by the project authority. All grievances and their resolution will be recorded. This mechanism has been disclosed to the local population.

45. A resettlement management system with proper staff and resources in the PPMO and in project counties will be established before resettlement commencement according to the RP, to internally monitor the resettlement progress and report semiannually to the World Bank. A dedicated staff will be appointed in the PPMO and each CPMO to be responsible for the resettlement-related assignment. In addition, an experienced external resettlement monitor will be contractually engaged according to the RP to ensure regular monitoring and reporting. Further, the training program in the RP will be conducted as early as possible to ensure capacity building.

Environmental

46. The project is proposed as a Category A operation under World Bank OP4.01 mainly because some project activities are in the vicinity of Poyang National Wetland Park and the project will support the cleanup of two polluted lakes. The project triggers the following World Bank EA safeguards policies: Environmental Assessment (OP 4.01), Natural Habitats (OP 4.04) and Pest Management (OP 4.09). The EA concluded that major negative impacts are caused by construction, however these can be effectively mitigated by the measures proposed in the ESMP.

47. **Environmental Assessment (OP 4.01).** EA was conducted for the Project in accordance with applicable Chinese EA regulations and the World Bank Safeguards Policies. The Project itself is a set of mitigation measures to address the existing environmental problems in the Poyang Lake Basin area, and will bring about overall environmental and social benefits, such as

(a) reducing pollution loads discharging into Poyang Lake, for example, annual reduction of 270 tons of COD, 560 tons of total nitrogen, and 44 tons of total phosphorus and (b) contributing to the improvement of living environment in the selected counties and benefit local people.

48. The project will also have some adverse impacts, including (a) general construction nuisance; (b) disposal of sediment (approximately 13,000 m^3 @ 90 percent moisture content) to be dredged from two polluted lakes (that is, Pipa in Yugan County and Zoujiazui in Duchang County) and from storm water drainage ditches in Fengxin County; and (c) adverse impacts (for example, odor, waste) associated with domestic solid waste collection and transfer stations, sewage pipelines and small-scale sewage treatment facilities in rural areas during operation. With respect to the cumulative impacts, the EA indicates that the project, as a set of mitigation measures, contributes to the alleviation of the pollution discharged to Poyang Lake. Cumulative impacts are not deemed relevant because most impacts of the project are construction-related impacts, which are short term, site specific, and limited, and can be readily mitigated with the measures proposed in the ESMP.

49. Alternative analysis was considered for the investment components during the feasibility study and the EA to minimize environmental impacts. The EA and the feasibility study analyzed alternatives for wastewater collection and treatment options, solid waste collection and transfer options, sediment dredging options, and 'without project' situation.

50. ESMP. Based on the EA, a stand-alone ESMP has been developed for each of the seven project counties to avoid, minimize, and mitigate the potential adverse impacts. The ESMPs specify mitigation and enhancement measures for the project activities, including the following:

(a) Environmental Code of Practices for civil work contactors to be included in the bidding documents and civil work contracts.

(b) Disposal of dredged sediments in an environmentally sound manner. Laboratory analysis of sediment samples have been taken confirming that dredged sediments can be reused as greening soil in wasteland or forestland. As such, sediments will be removed from the lakes, and, after dewatering, sent to the designated forestland for reuse.

(c) Good management of construction activities (for example, noise reduction, proper lighting, and ensuring health and safety of workers) to minimize potential impacts on birds; and only indigenous plants allowed to be used for the lakeshore restoration to prevent spread of invasive species.

(d) Measures to mitigate impacts associated with domestic solid waste collection and transfer stations and sewage pipelines for example, minimum buffer distance will be used between waste transfer stations and the nearby villages; minimum buffer distance will be used between villages' effluent outlets and the drinking water sources in Poyang County; and waste transfer station will be equipped with deodorization equipment. Wastewater and domestic solid waste to be collected at the counties will be safely disposed in the WWTPs or SWTPs. Due diligence (as part of the EA) was conducted confirming that these facilities are in compliance with

relevant Chinese regulations.

(e) Mitigation measures for abnormal scenarios, such as leakage of sewers, untreated wastewater discharge into sewer network due to accidents; and the measures for worker health and safety.

(f) Mitigation measure for the social issues identified in the social impact assessment.

51. The ESMPs also specify monitoring plan, capacity-training activities, and the budget for the ESMP implementation. ESMP implementation will be managed by the CPMOs, under guidance of the PPMO. Civil work contractors and on-site supervisors will be required to assign qualified staff to their teams to ensure effective implementation of the ESMP. The CPMOs and local Environment Protection Bureaus and external monitoring institutions will supervise the implementation of ESMPs.

52. **Natural Habitats (OP 4.04).** The project includes Poyang County located in the vicinity of Poyang Lake, which is an important natural habitat for migratory birds. Specifically, the project will finance small-scale wastewater treatment facilities (with total treatment capacity of 2,600m^3/day) at the existing 35 villages located in the Poyang National Wetland Park. To reduce the nonpoint source pollution, the project will build approximately 90 km bio-retention swales and constructed wetland around Zhuhu Lake, which is part of the Poyang National Wetland Park and serves as a drinking water source for local people. During the EA, relevant government agencies (for example, Environmental Protection Bureau and Forest Bureau) were consulted and their opinion considered in the project design. The EA indicates that these activities will cause general construction impacts, which are short term, site specific, and reversible. It is not expected that these activates would have the potential to cause significant conversion or degradation of natural habitats. Instead, these activities would reduce pollution loads discharged into Poyang Lake, the largest freshwater lake in China and benefit this natural habitat. As such Natural Habitats (OP4.04) is triggered.

53. **Pest Management (OP 4.09).** The project will not include any procurement of pesticides or pesticide application equipment; nor lead to increased pesticide use. The project will support training and studies for nonpoint sources pollution management for agriculture activities, which may lead to the reduction of pesticides discharged into Poyang Lake. As such, this policy is triggered.

54. Project preparation and implementation have been delegated to the PMO, which is housed in the Foreign Investment Management Office of Jiangxi PDRC. This office has been managing several World Bank- and ADB-financed projects in the past 20 years, and accumulated rich experiences in project management. This office is also the PPMO of ongoing World Bank-financed Jiangxi Poyang Lake Basin and Ecological Economic Zone Small Town Development Project. It is fully resourced and staffed (project coordinator, full-time translator, and technical specialists for finance, procurement, and water resources and safeguards). At the county level, all seven project counties have established the PLGs and PMOs. The PLGs are headed by county mayor or standing vice mayor, and formed by various government line agencies. PMOs are established in the County Development and Reform Commission, Foreign Investment Management Office, or Poyang Lake Basin Management Office. The World Bank provided

training to CPMOs on safeguards policies. Experienced safeguards consultants have been hired to assist with the preparation of safeguards instruments, and more consultants will be hired during implementation.

55. **Public consultations and information disclosure.** During the EA preparation, two rounds of public consultation were undertaken: the first round at the beginning of EA preparation starting in November 2015, and the second round in 2016 after the first draft EA safeguards documents were prepared. Consultations were carried out through questionnaires, interviews, and meetings with project-affected people, experts, and government agencies. In general, local people expressed their support to the proposed project. Main feedback from the public has been addressed in the project design and the ESMPs' mitigation measures. In accordance with the World Bank's information disclosure policy, before project appraisal, the safeguards documents were locally disclosed at the local website and library on July 25, 2016 with an announcement published at local newspaper on July 30, 2016. The safeguards documents were disclosed at the World Bank's external website on September 9, 2016.

Monitoring and Evaluation

56. A result-based MES will be developed and established under the project, and will be implemented by the PMOs at provincial and county levels. The MES includes the following:

(a) **MIS.** The project MIS will be developed by the PPMO and installed in all PMOs for physical and financial progress reporting. The MIS will be consolidated at the provincial level and provided to the World Bank in semiannual periodic reports.

(b) **MES.** The project MES will include a database for overall project outcome or PDO indicators and intermediate outcome indicators for each component. The MES results will be provided in periodic reports.

(c) **Reporting.** The PPMO will provide progress reports to the World Bank (using the MIS and the MES) twice a year (by February 15 and August 15). The M&E report will provide data on the agreed key outcome and output indicator target achievement and financial and physical progress. Project implementation reports will include the semiannual project progress report, the annual overall project M&E report, the midterm report and the Implementation Completion and Results Report. Special technical M&E reports will include the environmental M&E reports, the social evaluation reports, and the resettlement M&E reports.

57. **Institutional responsibilities.** The MES and database will be maintained by the PPMO at the provincial level. All project implementation agencies at the county level will designate a specific unit and/or staff to be responsible for these functions. The CPMOs will be responsible for the collection and consolidation of data from various implementation agencies and for producing the required M&E reports. The MIS and MES responsibilities of the PPMO will include (a) formulating uniform M&E standards and the key indicator system, and supervision of the implementation and operation of the project MIS and MES; (b) conducting training, guidance, supervision, and inspection of county-level MIS and MES institutions and personnel; (c) carrying out field inspections, consolidation of data, studies on important issues, and report writing; and (d) submitting MIS and MES reports to the World Bank.

ANNEX 4: IMPLEMENTATION SUPPORT PLAN

CHINA: Poyang Lake Basin Town Water Environment Management Project

1. The implementation arrangements, responsibility division and staffing, implementation schedule, procurement plan, first-year program, and counterpart funding plan, and TOR for different technical assistance and implementation support consultants, have also been prepared but need to be updated based on comments by the World Bank team. Likewise, procurement and FM manuals have been prepared. While preliminary designs have been drafted under Components 3 and 4, the Jiangxi Province plans to carry out the detailed design and procurement of the priority works as soon as the loan negotiation has been completed. The core staff of the PPMO and the CPMOs have been appointed and some have received related training.

2. Several consulting services have been identified and will be required for the project implementation and they are listed in the following paragraphs. The TOR for the consulting services will be developed according to the actual requirements for the project implementation: (a) project management consultants to assist the CPMO/PPMO in many aspects of project management and implementation; (b) construction supervision consultants to carry out construction supervisions for each subproject; (c) land acquisition and resettlement consultants to assist the CPMO/PPMO in implementing the land acquisition and resettlement plan and carrying out the required monitoring; (d) environment monitoring consultants to assist the CPMO/PPMO in implementing the Environmental Management Plan and carrying out the required monitoring; (e) social impact monitoring consultants to assist the CPMO/PPMO in establishing the monitoring framework and implementing the annual monitoring program for the PDOs and other social aspects.

Implementation Support Plan

3. The Implementation Support Plan in table 4.1 describes World Bank support for the implementation of risk mitigation measures and provides the technical advice necessary to facilitate achieving the PDO (linked to results/outcomes identified in the result framework). The plan also takes into account the requirements to meet the World Bank's fiduciary obligations.

Table 4.1. Implementation Support Plan

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First 12 months	**General.** Assure that all PMOs are familiar with the project approach and that the PIM is being followed. Familiarize the PMOs with all relevant administrative and operational aspects of project implementation. Provide consistent and ongoing support on operational and technical implementation issues. **Technical.** Review and comment on investment proposals. **Procurement.** Provide training to the PMO staff; review procurement documents and provide timely feedback; provide detailed guidance on World Bank Procurement Guidelines; monitor procurement progress against the detailed Procurement Plan; and conduct procurement post review assessments once a	TTLs, Agricultural Economist Social Development/ Institutional Specialist	US$ 100,000	—

	year. **FM.** Provide training to the PMO staff; assess the project's FM system, including but not limited to, accounting, reporting, and internal controls; review the project's FM reports on a regular basis; and review annual audit reports. **Social development/institutional development.** Ensure attention and support to PMOs in the establishment of equitable, transparent cooperative arrangements. **Environment and social safeguards.** Ensure that the related safeguard documents are well understood and the provisions are implemented.	Procurement Financial Management System Environmental Safeguards Social Safeguards		
12–48 months	**General.** Review and understand all implementation processes and remove implementation obstacles; refine and revise PIM as needed; move focus toward dialogue and capturing lessons; and prepare for midterm review. **Technical.** Visit ongoing project investments and provide feedback; continue prior and/or post review of investment proposals and provide comments. **Social development/institutional development.** Ensure attention and support to the PMOs in the establishment of equitable, transparent cooperative arrangements and monitor benefit sharing arrangements and poverty impact. **Procurement.** Review procurement documents and provide timely feedback; monitor procurement progress against Procurement Plan; conduct procurement post reviews at least once a year. **FM.** Implementation support will include (a) review the implementation of project's FM system, including but not limited to accounting, reporting, and internal controls; (b) review of the project's FM reports on a regular basis; and (c) review of the annual audit reports. **Environment and Social Safeguards.** Review environmental and social impact.	TTLs, Agricultural Economist Social Development/ Institutional Specialist Agribusiness Procurement FMS Environmental Safeguards Social Safeguards	US$90,000 per year	—
48–60 months	**General.** Understand failure and success parameters in close dialogue with the implementing agencies; facilitate exchange among counties and cooperatives to learn from each other; prepare detailed learning and analysis framework; and prepare for end-project evaluation. **Technical.** Visit ongoing project investments and provide feedback; support technical analysis of project investments. **Social development/institutional development.** Ensure attention and support the PMOs in the participatory process and poverty impact. **Procurement.** Review procurement documents and provide timely feedback; monitor procurement progress against Procurement Plan; conduct procurement post review at least once a year. **FM.** Review implementation of the project's FM system, including but not limited to, accounting,	TTL Agricultural Economist Social Development/ Institutional Specialist Procurement FMS Environmental Safeguards Social	US$90,000 per year	—

	reporting, and internal controls; review the project's FM reports on a regular basis; and review annual audit reports. **Environment and social safeguards.** Review environmental and social impact and extract lessons; provide guidance to the social and environmental impact assessment.	Safeguards		

Note: FMS = Financial Management System; TTL = Task Team Leader.

Skill Mix

Skills Needed	Number of Staff Weeks (Annual)	Number of Trips	Comments
Task Team Leader	12	Two per year, three in first year	Country office or headquarter-based
Social Development/ Institutional Specialist	6	Fields trips as required	Consultant
Social Specialist	3	Fields trips as required	Country office-based
Environment Specialist	3	Fields trips as required	Country office-based
Procurement Specialist	3	Two per year	Country office-based
Financial Management Specialist	3	Two per year	Country office-based
M&E Specialist	3	Two per year, three in first year	Consultant
Agricultural Economist	3	Two per year, three in first year	Consultant
Low Impact Development, Sponge City Development Specialists	3	Field trips as required	Consultant
Integrated Lake Water Environment Management Specialist	1	Field trips as required	Headquarter-based

ANNEX 5: FINANCIAL AND ECONOMIC ANALYSIS

I. Expected Development Impact

1. The project will generate a broad range of benefits for sustainable economic development, environment protection, health improvement, and biodiversity conservation. Specifically, the project interventions will help to reduce pollution load discharged into the Poyang Lake and contribute to the improvement of public health and the living conditions in the selected seven counties. The project will also invest in pollution source control, which is the cost-effective way and long-term solution to protect the environment and human health. In addition, the project will enhance biodiversity conservation as the Poyang Lake is a key habitat for half a million migratory birds.

II. Economic Analysis

2. **Methodology—cost-effectiveness.** The methodology for the economic evaluation of all project components is 'cost effectiveness.' A cost-benefit analysis was not carried out due to difficulties in quantifying the environmental benefits related to the project. The rationale for adopting a cost-effectiveness methodology is that for wastewater/sanitation and solid-waste projects' benefits are difficult to quantify in a reasonably reliable manner, especially those pertaining to public health and the environment. In wastewater/sanitation and solid-waste projects in China, indeed in most World Bank projects in the sector, cost effectiveness is the preferred and most frequently applied methodology. The key objective of a cost effectiveness analysis is to demonstrate that the proposed investments have a sound strategic rationale with regard to the overall project objectives and that these objectives are met in the most cost-effective way (based on evaluated lifecycle costs and compared on a Net Present Value (NPV) per unit incremental cost basis).

Solid Waste Collection and Transportation System

3. This component is to improve solid waste collection and transportation system in rural and urban areas to reduce solid waste disposal to the river system of the Poyang Lake Basin. This component covers five counties, which are Shangli, Duchang, Poyang, Yugan, and Jing'an. In three counties among five, the component will help installation of domestic solid waste collection and transportation facilities in the rural areas. Effort in Jing'an County is on completing and upgrading existing domestic solid waste collection and transportation system in Jing'an County central urban area. The project intervention made in Yugan County is to upgrade its solid waste collection and transportation facilities along its Pipa Lakeshore, a lake in the central urban area of the Yugan County. The investment in this component includes procurement of waste bins, waste collection/transportation vehicles, installation of solid waste transfer stations, installation of solid waste sorting/composting facilities, and installation of local solid waste management information/control system (SMART sanitation).

4. The purpose of the solid waste treatment is to reduce pollution through the introduction of a reliable system of collection, transport, and disposal of solid waste. This will generate multiple benefits, including improvement of the local environment by removing odorous and unsightly garbage at collection points and open dumps, and reduce pollution generated from

storm water run-off. With regard to public health, this will reduce human exposure to unsanitary waste. Further, the improved collection and disposal of solid waste will make the area more attractive to investors and tourists, and potentially lead to an increase in property prices.

5. **Alternatives considered.** Solid waste management component has been designed based on operational disciplines for a domestic solid waste management system. Engineering design has been preceded according to different community characteristics (communities in the rural area and/or communities in the urban area). With a different local situation, effort has been made to design a robust solid waste collection, transportation system, and also ensure its cost-effectiveness. In the meantime, existing local solid waste management facilities have also been carefully integrated into the planned collection and transportation system to ensure a well-established local solid waste collection, transportation, treatment, and disposal system. For each project intervention, technical design alternatives, location options, and other parameters were evaluated on the basis of technical, environmental, and economic criteria to identify the most cost-effective solution to the selection of the collection system, transfer, and transportation methods, and final disposal. With regard to optimizing the collection system, the location of transfer stations and vehicles types/sizes, various locations for transfer stations and collection points were considered to collect the waste at the lowest cost. Detailed comparisons of alternatives and the selected options are contained in the county FSRs prepared by the two National Development Reform Commission certified Class A consulting firms. Examples of the alternative comparison have been reproduced in the following paragraphs:

- A: Alternative comparison for waste collection vehicle in Duchang Option I: hauling waste tank – unloading waste from tank – bringing empty tank to site; Option II: going to site – unloading waste to truck – going to another site until truck is full – go back to transfer station (or disposal site) to unloading waste.

- Option I has been selected by comparing the investment and O&M costs of the two options (Detailed cost flow calculations are contained in the County FSR).

- B: Alternative comparison for transfer station: Option I – without transfer station: collecting waste and then, unloading waste to disposal (or treatment facility); Option II – with transfer station: collecting waste, unloading waste to transfer station, loading compacted waste to large transportation truck, unloading waste to disposal (or treatment facility).

- Option II has been selected by comparing the investment and O&M costs of the two options (Detailed cost flow calculations are contained in the County FSR).

Enhancement of Domestic Wastewater Management System

6. This subcomponent will finance rehabilitation and expansion of urban and rural wastewater collection to improve capacity of wastewater collection of selected counties. Main project activities include construction of wastewater collection networks (including household connections) in Duchang, Jing'an, and Jishui Counties. An integrated method taking into account the entire wastewater collection system of the counties has been adopted to design the wastewater collection system. In addition, the size of pipes and alignments of the sewer

collections were optimized based on the actual survey data rather than based on the quota as traditional way. The interventions would help the counties in increasing the coverage of wastewater collection and improve the operation of existing WWTPs in the counties.

7. The wastewater management includes both urban and rural wastewater management subcomponents. The urban wastewater management has been designed with the target of increasing the coverage of sewer collection so as to improve the efficiency of the existing WWTPs in an integrated manner, that is, the design of expanded/renovated portion of sewer collection is verified under the entire system which is not a traditional practice in China. The design is also based on the thorough analysis of wastewater generation versus water demand projection rather than on the water consumption quota suggested in the national standards. Similar principles also apply to the design of rural wastewater subcomponent, including the household connections.

8. The objective of the wastewater subcomponent is to reduce rural and urban pollution generated from untreated wastewater directly discharged into the lake. The principal project benefits consist of significantly reduced discharges of pollutants (in particular, the BOD, COD, suspended solids, nitrogen, and phosphorus) into the lake and local groundwater sources. Wastewater treatment will contribute to improvements in the local environment, public health, and the economy. In particular, the local environment can be improved by reducing unpleasant odors and sights; public health by reducing human exposure to untreated wastewater and water borne diseases (potentially lowering health care costs); and the local economy by potentially increased tourism, investment, and appreciated property values.

9. **Alternatives considered.** For each project intervention, technical design alternatives, location options, and other parameters were evaluated on the basis of technical, environmental, and economic criteria to identify the most cost-effective solution along all key design dimensions including the collection system. With regard to the design of the collection system, various topological, land availability, gravity flow versus pumping stations cost considerations, and other parameters were evaluated and checked for consistency with projected local development patterns and the existing drainage master plans. Detailed comparisons of alternatives and the selected options are contained in the County FSRs prepared by the two NDRC certified Class A consulting firms.

A Case for Alternatives Comparison (Cost-effectiveness analysis). Villages along lakeshore in Shuanggang Township and two villages from Baishazhou Township in Poyang County have been selected to demonstrate the alternative comparison between centralized treatment system and scattered wastewater treatment units.

10. Six villages from Shuanggang Township and 2 villages from Baishazhou Township are put into one group based on their locations.

11. **Discharge standard.** The Jiangxi Provincial Government has issued its local discharge standard specifically for the area of the Poyang Lake Basin with reference No. of DB36/ 852-2015 “Wastewater discharge standard of Poyang Lake Eco-economic District in Jiangxi Province.” This standard has set up stringent discharge requirement for wastewater treatment facility installed in Poyang Lake Eco-economic District, where the Zhuhu Lake and its adjacent area are located.

12. **Option I:** All wastewater generated from eight lakeshore villages would be collected through wastewater collection network and sent to a WWTP through seven pump stations (because these villages are separated with small hills).

13. **Option II:** Instead of having one WWTP, there would be a treatment unit installed in each of these eight villages.

14. Least-cost Comparison. Based on the description above, a least-cost (NPV calculation for cost flows during project life) comparison has been made for the two proposed technical options. The results are shown in table 5.2.

Table 5.1 Least-Cost Comparison for the Two Technical Options

Items	Option I – centralized (CNY)	Option II – scattered (CNY)
Investment		
Treatment plant	12,342,000.00	22,750,000.00
Network	4,000,000.00	0.00
Pump station	2,100,000.00	0.00
Total	18,442,000.00	22,750,000.00
O & M (20 years)		
	14,591,842.98	6,079,934.58
NPV	33,033,842.98	28,829,934.58

15. Therefore, a scattered village-level wastewater treatment unit solution has been selected and proposed to the project.

III. Financial Analysis

16. The project will not set up new wastewater/SWTPs except some small-scale wastewater treatment facilities. Rather the project interventions will focus on increasing the coverage of sewer/solid waste collection. The current solid waste management operations are managed by the county's environmental sanitation stations—under the Construction Commission/Bureau – mainly responsible for providing collection, transportation, and disposal services in an integrated manner.

17. Solid waste management services currently rely on significant budgetary transfers—in the light of relatively low solid waste user charges (US$30 per household per year) and low collection rates (51 percent). The project will support the counties to increase solid waste collection (80 percent), which is expected to also increase the revenue collection efficiency rates in urban areas and mobilize farmer households to deliver the solid waste to the collection points through beneficiary participation.

18. In urban areas, wastewater treatment costs are covered by a surcharge embedded in the water tariffs following the national and provincial decrees. As such, the wastewater treatment plants are financially supported by local budget allocations through contractual arrangement in urban areas, while in rural areas, small-scale wastewater treatment facilities built will be managed by the villages through beneficiary participation.

IV. Fiscal Impact Analysis

19. As most of the project investments are for public infrastructure and have little revenue generation, fiscal impact analysis of the project has been conducted to ensure that the selected counties have sufficient financial resources to cover (a) counterpart funds; (b) loan repayment; and (c) additional O&M costs for works put up under the project to be covered by budget allocations.

20. County-level fiscal analysis of the past three years indicates that all participating project counties have sufficient financial resources to contribute counterpart funds and service debt incurred under the project. In all counties, the World Bank project constitutes only a very small fraction of total Government project budget expenditure (from 0.5 to 2.3 percent, see table). As such, the debt service obligations and O&M costs after project completion would constitute even smaller portions of the local government revenues. All the project county counties therefore are in a good fiscal position to provide counterpart funds, service the World Bank loan, and ensure the O&M costs for the infrastructure works built under the project.

Table 5.2. Financial Data for the Year 2013–15 and Required Counterpart Funds (CNY, millions)

	2013			2014			2015			Bank project	
County	Budget Expenditure	Local Project Investment	%	Budget Expenditure	Local Project Investment	%	Budget Expenditure	Local Project Investment	%	Required Funds Each Year	% of Local Project Investment of 2015
Duchang	2,836	1,521	53.6	3,194	1,705	53.4	3,513	1,832	52.2	8.5	0.5
Poyang	4,805	2,955	61.5	4,751	2,898	61.0	5,665	3482	61.5	20.3	0.6
Yugan	3,072	420	13.7	3,216	415	12.9	3,366	558	16.58	13.1	2.3
Jing’an	1,151	510	44.3	1,385	620	44.8	1,568	580	37.0	8.6	1.5
Fengxin	2,075	479	23.1	2,304	609	26.4	2,777	613	22.1	12.9	2.1
Shangli	2,469	1,430	57.9	2,516	1,260	50.1	2,793	1340	47.98	14.6	1.1
Jishui	2,184	716	32.8	2,319	496	21.4	2,500	667	26.7	12.0	1.8

ANNEX 6: PROJECT MAP

CHINA: Poyang Lake Basin Town Water Environment Management Project

(IBRD 42409)