

Document of
The World Bank

Report No: 80443-BR

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$225 MILLION

TO THE

STATE OF ESPÍRITO SANTO

FOR THE

INTEGRATED SUSTAINABLE WATER MANAGEMENT PROJECT

February 13, 2014

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CURRENCY EQUIVALENTS

(Exchange Rate Effective December 12, 2013)

Currency Unit = Brazilian Real (R\$)
R\$2.33 = US\$1
US\$0.52 = R\$1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ANA	National Water Agency's	INTERAGUAS	Federal Integrated Water Project
APP	Areas of Permanent Protection	IPF	Investment Project Financing Loan
ARSI	Regulatory Agency for Water, Sanitation and Road Infrastructure	IRR	Internal Rate of return
ATER	Technical Assistance to Rural Producers	IS	Project Implementation Support
BOD	Biochemical Oxygen Demand	LCS	Least Cost Selection
CadUnico	Federal Government's Social Programs Registry	M&E	Monitoring and Evaluation
CEL	Special Bidding Commission	NCB	National Competitive Bidding
CESAN	Espírito Santo Water and Sanitation Company	ORAF	Overall Risk Rating Explanation
COMDEVIT	GVMR Metropolitan Council	PCR	Physical Cultural Resources
CONAMA	National Environmental Council	PDO	Project Development Objective
CPS	Country Partnership Strategy	PES	Payments for Environmental Services
CQS	Consultant's Qualification-based selection	PGE	State Attorney General
CTG	Core Thematic Groups	PNAD	National Household Surveys
DA	Designated Account	PNAS	National Social Assistance Policy
DEM	Digital Elevation Model	POA	Annual budget
DRM	Disaster Risk Management	QBS	Quality Based Selection
EIA	Environmental Impact Assessment	QCBS	Quality and Cost Based Selection
EMF	Environmental Management Framework	RFP	Request for proposal
EMP	Environmental Management Plan	SAFF	Financial and Physical Monitoring System
FBS	Fixed Budget-based Selection	SBD	Standard Bidding Documents
FM	Financial Management	SEAG	State Secretariat for Agriculture
Fundágua	State Fund for Water Resources	SEAMA	State Secretariat of the Environment and Water Resources
GDP	Gross Domestic Product	SECONT	Secretariat of control and Transparency
GEOBASES	State's Integrated Geospatial Database	SEDURB	State Secretariat of Sanitation, Housing and Urban Development
GVMR	Greater Vitoria Metropolitan Region	SEFAZ	State Secretariat of Finance
IBGE	Brazilian Institute of Geography and Statistics	SEPAM	State Secretariat of Special Projects and Metropolitan Government
IBRD	International Bank for Reconstruction and Development	SES	State of Espírito Santo
ICB	International Competitive Bidding	SIAFEM	Integrated Administrative and Financial State and Municipal System
IDA	International Development Association	SIGEFES	State budgeting and accounting system
IDAF	State Agriculture and Forestry Defence Institute	SMC	Coastline Modelling System
IDF	Family Development Index	SOEs	Statements of Expenditures
IEG	Independent Evaluation Group	SSS	Single Source Selection
IEMA	State Institute of the Environment and Water Resources	TA	Technical Assistance
IFRs	Interim Unaudited Financial Reports	TTL	Task Team Leader
IJSN	Jones dos Santos Neves Institute	UASB	Up-flow Anaerobic Sludge Blanket
INCAPER	State Rural Technical Assistance Research and Extension Institute	UGP	Project Management Unit
		WB	World Bank

Regional Vice President:	Hasan A. Tuluy
Country Director:	Deborah L. Wetzel
Sector Director:	Ede Jorge Ijjasz-Vasquez
Sector Manager:	Wambui Gichuri
Task Team Leader:	Lizmara Kirchner

BRAZIL
Espírito Santo - Integrated Sustainable Water Management Project
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PAD DATA SHEET*Brazil**Espírito Santo Integrated Sustainable Water Management Project (P130682)***PROJECT APPRAISAL DOCUMENT***LATIN AMERICA AND CARIBBEAN**LCSWS*

Report No.: PAD545

Basic Information			
Project ID	Lending Instrument	EA Category	Team Leader
P130682	Specific Investment Loan	B - Partial Assessment	Lizmara Kirchner
Project Implementation Start Date		Project Implementation End Date	
27-Sep-2014		31-Oct-2020	
Expected Effectiveness Date		Expected Closing Date	
27-Sep-2014		31-Apr-2021	
Joint IFC			
No			
Sector Manager	Sector Director	Country Director	Regional Vice President
Wambui G. Gichuri	Ede Jorge Ijjasz-Vasquez	Deborah L. Wetzel	Hasan A. Tuluy
Borrower: State of Espírito Santo			
Responsible Agency: State Secretariat of Government (SEG)			
Contact:	Tyago Ribeiro Hoffmann	Title:	Secretário de Estado de Governo
Telephone:	55-27-3636-1221	Email:	gabinete@seg.es.gov.br
Project Financing Data(US\$M)			
<input checked="" type="checkbox"/> X	Loan	<input type="checkbox"/> Grant	<input type="checkbox"/> Other
<input type="checkbox"/> Credit		<input type="checkbox"/> Guarantee	
For Loans/Credits/Others			
Total Project Cost (US\$M):		323.10	
Total Bank Financing (US\$M):		225.00	
Financing Source		Amount(US\$M)	
Borrower		98.10	
International Bank for Reconstruction & Development		225.00	
Total		323.10	

Expected Disbursements (in USD Million)									
Fiscal Year	2014	2015	2016	2017	2018	2019	2020	2021	
Annual	2.00	10.00	37.00	43.00	50.00	50.00	20.00	13.00	
Cumulative	2.00	12.00	49.00	92.00	142.00	192.00	212.00	225.00	

Project Development Objective(s)
Proposed Development Objective(s)
The project development objectives (PDO) are to improve sustainable water resources management and to increase access to sanitation in the State of Espírito Santo.

Components	
Component Name	Cost (USD Millions)
Integrated Water Management and Disaster Risk Management	59.5
Efficient Water Supply Services and Increased Access to Sanitation	215.6
Watershed Management and Restoration of Forest Cover	23.6
Project Management, Supervision and Institutional Strengthening	23.8

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

Description of Covenant			
Conditions			
Name			Type
Legal Opinion - Borrower			Effectiveness
Description of Condition			
The Borrower, through a legal opinion satisfactory to the Bank, issued by the Borrower's counsel acceptable to the Bank, indicates that the CESAN Subsidiary Agreement and the INCAPER Subsidiary Agreement have been duly authorized or ratified by, executed and delivered on behalf of, the Borrower and is legally binding upon the Borrower in accordance with its respective terms.			
Name			Type
Legal Opinions- CESAN and INCAPER			Effectiveness
Description of Condition			
CESAN and INCAPER, through a legal opinion satisfactory to the Bank, issued by CESAN and INCAPER's respective counsels, acceptable to the Bank, indicate that its pertinent Subsidiary Agreement has been duly authorized by, and executed and delivered on behalf of, CESAN and INCAPER, and is legally binding upon CESAN and INCAPER, all as the case may be, in accordance with its respective terms.			
Name			Type
Loan Registration			Effectiveness
Description of Condition			
The Loan has been duly registered with the Guarantor's Central Bank			
Team Composition			
Bank Staff			
Name	Title	Specialization	Unit
Stefano P. Pagiola	Senior Environmental Economist	Senior Environmental Economist	LCSSD
Gunars H. Platais	Senior Environmental Economist	Senior Environmental Economist	LCSN
Lizmara Kirchner	Senior Water & Sanitation Specialist	Team Lead	LCSWS
Marcos T. Abicalil	Sr. Water & Sanitation Specialist	Sr. Water & Sanitation Specialist	LCSWS
Martin Gambrill	Lead Water & Sanitation Specialist	Lead Water & Sanitation Specialist	LCSWS
Patricia Miranda	Senior Counsel	Senior Counsel	LEGLE/LEGOP
Jose C. Joaquin Toro Landivar	Senior Disaster Risk Management Specialist	Senior Disaster Risk Management Specialist	LCSDU
Michel Matera	Senior Disaster Risk Management Specialist	Senior Disaster Risk Management Specialist	LCSDU

Jean-Martin Brault	Water and Sanitation Specialist	Water and Sanitation Specialist	LCSWS		
Paula Restrepo Cadavid	Young Professional	Impact Evaluation	ECSUW		
Monica Joyce McDonough	Junior Professional Associate	Junior Professional Associate	LCSDU		
Pamela Sofia Duran Vinueza	Team Assistant	Team Assistant	LCSWS		
Etel Bereslawski	Senior Procurement Specialist	Procurement	LCSPT		
Maria João Pagarim Ribeir Kaizeler	Financial Management Specialist	Financial Management	LCSFM		
Miguel-Santiago da Silva Oliveira	Senior Finance Officer	Disbursements	CTRLN		
Miriam Muller	Extended Term Consultant	Gender Specialist	LCSPP		
Non Bank Staff					
Name	Title	Office Phone	City		
Alexandre Fortes	Environmental Specialist		Brasilia		
Carlos Tucci	Integrated Urban Water Management Specialist		Porto Alegre		
Flavia Fonseca Carbonari de Almeida	Social Development Specialist/Crime &Violence		Buenos Aires		
Luz Maria Gonzalez	Economist and Financial specialist		Ohio		
Monica Porto	Water Resources Specialist		São Paulo		
Paulo Canedo De Magalhães	Engineer		Rio de Janeiro		
Soraya Melgaço	Social Specialist		Belo Horizonte		
Locations					
Country	First Administrative Division	Location	Planned	Actual	Comments
Brazil	Espírito Santo	Estado do Espírito Santo		X	
Institutional Data					
Sector Board					
Water					
Sectors / Climate Change					
Sector (Maximum 5 and total % must equal 100)					
Major Sector		Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Water, sanitation and flood protection		Sanitation	50	11.9	-
Agriculture, fishing, and forestry		Forestry	25	22.7	22.7

Public Administration, Law, and Justice	Public administration- Water, sanitation and flood protection	25	25.8	-
Total		100		
<input type="checkbox"/> I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.				
Themes				
Theme (Maximum 5 and total % must equal 100)				
Major theme	Theme	%		
Environment and natural resources management	Water resource management	35		
Environment and natural resources management	Environmental policies and institutions	30		
Environment and natural resources management	Climate change	20		
Social protection and risk management	Natural disaster management	15		
Total		100		

I. STRATEGIC CONTEXT

A. Country Context

1. In the last two decades, Brazil has made significant advances in economic management, poverty reduction, and social indicators. Growth in employment and labor incomes, as well as the implementation of targeted social assistance programs, such as *Bolsa Família*, have contributed to reducing in the share of Brazilians living below the extreme poverty line of R\$70 a month from 10.5 percent at the start of the 2000s to 4.7 percent in 2011, as well as in reducing inequality, as reflected in a fall in the Gini coefficient from 0.59 to 0.53 over the same period.

2. Despite, or perhaps because of, the economic and social progress of the past two decades, Brazil's development is at a crossroads. Economic growth slowed from 7.5 percent in 2010 to only 0.9 percent in 2012, and is not expected to exceed 2.5 percent in 2013. The slowdown was associated with external events, and was mitigated by fiscal and monetary policy responses, as well as a sound banking system, large reserves and moderate debt levels. Nevertheless, future growth appears to be limited by structural bottlenecks in infrastructure, human capital, and poor financial intermediation.

3. At the same time, a growing middle class (the result of growth and improved income distribution) is drawing attention to the failings of the political system, and its inability to deliver public services such as education, health and transport efficiently and cost-effectively. Mass demonstrations in most major cities in Brazil during June 2013 left little doubt as to the political importance of good governance and effective service delivery in Brazil.

4. Water resources and associated infrastructure services are essential elements for Brazil's sustainable and equitable development. Basic services such as water supply and sanitation as well as the quality of water resources have not kept pace with Brazil's rapid population growth and urbanization (82 percent of the population lives in urban areas). Access to sewage collection in Brazil stands at about 46 percent, and as a result of insufficient coverage and treatment, only 38 percent of the sewage generated is treated before it is discharged into the environment.¹ Furthermore, even existing supplies are threatened by watershed degradation. Expanding access to water and sanitation services and ensuring the quality of water resources is crucial to the country's agenda for socially equitable and environmentally responsible economic growth.

5. Brazil ranks among the top 10 countries in terms of deaths due to natural disasters and in the number of reported events. Adverse natural events are recurrent in Brazil, especially those of hydrometeorological nature, are frequent in Brazil, with significant negative social and economic impacts. Since 2008, according to Damage and Loss Assessment studies conducted in four states affected by disasters (Rio de Janeiro, Santa Catarina, Alagoas and Pernambuco), disaster-related costs have totaled close to R\$15.3 billion. Disaster Risk Management (DRM) in Brazil is a new area in the development sphere. The high population concentration in urban areas is the main determinant of vulnerability to natural hazards in the country, mostly driven by poor land use and planning that characterizes Brazilian cities.

B. Sectoral and Institutional Context

6. The State of Espírito Santo (SES) is currently confronted with these challenges, particularly as it faces rapid population growth in the Greater Vitória Metropolitan Region

¹ Brazil's National Sanitation Information System, 2010

(GVMR),² which holds close to half of the State's 3.5 million population³ and contributes 62 percent of the State's GDP. The GVMR's population density increased from 620 inhabitants per km² in 2000 to 728 in 2010 and is estimated to reach 744 in 2012.⁴

7. The rapid urbanization process in the SES has been largely unplanned. Population growth and concentration has increased pressure on the State to provide adequate access to basic water and sanitation services and ensure quality of water resources. Projections indicate that due to population growth and increased industrial water consumption will force the GVMR to seek additional water sources to meet the region's demand within 20 years. This stress on the availability and quality of water resources is further exacerbated by threats to water resources in areas upstream of the GVMR. Watershed degradation is resulting in high levels of erosion and insufficient coverage of sewerage collection and treatment is resulting in contamination. While sewerage coverage in the GVMR, under the management of the State Water and Sanitation Company (CESAN), has increased from 20 to 60 percent between 2004 and July 2012,⁵ municipalities in the Jucu and Santa Maria da Vitória watersheds continue to generate pollution loads that compromise the quality of the downstream water resources and coastal areas because of inadequate wastewater collection and treatment.

8. In 1998, State Law 5818 introduced the State's first policy framework specifically for the management of water resources. It defined the principles of integrated water resource management with other sectors, such as sanitation and agriculture, and established the Espírito Santo Integrated Management and Monitoring System for Water Resources. However, the SES has only recently initiated its practical implementation after improving its institutional structure and the capacity of the State's Water Basin Committees, the State Secretariat of Environment and Water Resources (SEAMA). Additionally, with many actors present in the water sector, actions need to be better coordinated at the metropolitan level, particularly the management of storm water which relies on drainage master plans developed independently and with little inter-municipal coordination. This becomes particularly problematic when managing land use evolution and flood impacts on the entire metropolitan region.

9. The SES has experienced an increased intensity and frequency of extreme events in recent years. Of a total of 376 extreme events in that same decade, 276 were related to flash floods and landslides, and 69 to droughts, increasing water scarcity in some municipalities. This has accentuated the conflicts between the various water uses, leading to the construction of ad-hoc hydraulic infrastructure without adequate planning. The SES has recognized the importance of disasters and its integration with long-term water resources management and is committed to a more proactive approach to dealing with them.

10. The SES has also suffered from extensive environmental degradation over the past 50 years, which has also contributed to putting stress on the quantity and quality of water resources. The SES is located in the Atlantic Forest biome which, due to the exceptional level of biodiversity and its vulnerability to continuous threats, is among the world's highest priority areas for conservation. Less than 8 percent of its original cover remains in the State and it is estimated that only 4.2 percent of Espírito Santo's watersheds are covered with native forests.⁶

² The urban population of Espírito Santo increased from 79.5 percent in 2000 to 83.4 percent in 2010 (IJSN, 2010).

³ Brazilian Institute of Geography and Statistics (IBGE), 2010.

⁴ Jones dos Santos Neves Institute (IJSN) – www.ijsn.es.gov.br.

⁵ The Espírito Santo Water and Coastal Pollution Management Project (P087711), US\$107.5 million.

⁶ Sustainable Development Indicators (IBGE, 2010).

The loss of forest coverage has contributed to the reduction in groundwater recharge as well as the increased velocity of surface runoff. Detrimental land use patterns in the Santa Maria da Vitória and Jucu watersheds upstream of the GVMR have resulted in severe erosion, substantially increasing sediment loads and reducing the quality and timely delivery of water supplies. These two watersheds are not only crucial to the GVMR in that they supply 95 percent of its drinking water, but also because they retain more than 40 percent of their original forest cover and represent more than a third of the remaining forests in the State.

11. The State has made forest and watershed conservation and sustainable management of its natural resources one of the central themes in its latest 20-year plan (2025 Vision) which also commits to sustaining and building on the results in sanitation to promote the integrated management of water and environmental resources. The SES has also expressed its commitment to perform a comprehensive review, to be supported by the proposed project, of the way in which water resources and hydraulic infrastructure are being managed in the State, particularly in the GVMR. This review is expected to indicate potential institutional improvements, measures and tools to better plan and manage infrastructure investments (drainage, dams, etc.) as well as to reduce risks and better respond to natural disasters.

12. The Bank has a long relationship with the SES. With the closing of the Water and Coastal Pollution Management Project in 2011 and the anticipated closing of the Biodiversity and Watershed Conservation and Restoration Project⁷ in 2013, the proposed project will provide critical support for institutional strengthening and prioritized works and projects in order to leverage gains in the water, sanitation and environmental sectors over the past 15 years.

C. Higher Level Objectives to which the Project Contributes

13. The Project contributes to the SES's goals in establishing sustainable water resource management with the objective of improving the quality of life of the population through environmental preservation and conservation. The Project is active in strategic urban and rural areas that will have a high impact on equitable access to sanitation services, quality of water resources, environmental conservation and climate change mitigation and adaptation, identified as priority sectors by the State.

14. The proposed operation is fully consistent with the World Bank Group's Country Partnership Strategy (CPS) 2012-2015 (Report No. 63731-BR). The CPS recognizes water as an important element to achieve higher rates of inclusive and sustainable growth, highlighting the importance of integrated water resources management and improved environmental management. The CPS also highlights the need for strategic infrastructure investments such as those needed to expand access to improved basic sanitation and for more effective DRM. To further improve the sustainable management of natural resources and enhance resilience to climatic shocks, efforts are needed to reduce the vulnerability of Brazil's territory (including coastal zones) to climate change.

⁷ Since 2008, the World Bank, through a grant from the Global Environment Facility Trust Fund, supports the Espírito Santo Biodiversity and Watershed Conservation and Restoration Project (P094233), or *Florestas para Vida* Program, a pilot project to implement environmentally friendly land use practices and payment for environmental services in the Santa Maria da Vitória and Jucu watersheds. The project is scheduled to close in 2013, and lessons learned from this operation and other SES programs have led to the development of the *Reflorestar* Program which has set the goal of increasing forest cover by 30,000 hectares by 2014 and by 200,000 hectares by 2025.

15. Due to its complex and innovative multi-sectorial nature and to its implications for metropolitan management, the Project will serve as a catalyst and as a model for integrated urban water management in Brazil, the Latin American and Caribbean region and beyond. Throughout implementation, project experience and knowledge generated will be documented and disseminated.

II. PROJECT DEVELOPMENT OBJECTIVES

A. Project Development Objectives

16. The project development objectives (PDO) are to improve sustainable water resources management and to increase access to sanitation in the State of Espírito Santo.

17. It will be achieved by: strengthening the State's water sector institutions, providing increased wastewater collection and treatment services, supporting reforestation and sustainable land management practices, and improving the state's capacity to identify, monitor and prepare for disaster risks.

B. Project Beneficiaries

18. Investments in sewerage, urban water management, environmental and water resources management will benefit GVMR's population of 1.7 million with improved drinking and coastal water quality, as well as the river basins population where the Project will intervene (770,000). Sewerage investments ensure adequate wastewater collection and treatment in: (i) Vila Velha and Cariacica (GVMR), and (ii) 9 municipalities in the interior, for a total of 166,000 people. As such, the number of direct beneficiaries is estimated at 2.63 million people. With the inclusion of planning and regulation instruments for integrated water management, the Project will benefit the 3.5 million state population, with the objective of securing water availability and quality.

19. According to Brazilian Institute of Geography and Statistics (IBGE) data from 2008, Caparaó is one of the State's regions with the higher incidence of poverty, with 40.4 percent of its population considered poor. In the municipality of Ibatiba, 55 percent of the population is considered poor, one of the highest incidences of poverty in the state. Additionally, five out of the ten municipalities with the lowest Family Development Index (IDF) in the SES will benefit from project investments, namely Divino São Lourenço, Irupi, Iúna, Ibatiba and Santa Maria do Jetibá.⁸ Finally, 41.7 percent of the households in Caparaó do not have access to an adequate sanitation solution, highlighting the link between sanitation and poverty.

C. PDO Level Results Indicators

20. The PDO will be measured against the following indicators (i) biochemical oxygen demand (BOD) pollution loads removed by activities supported under the project; (ii) population in urban areas provided with access to improved sanitation facilities under the project; (iii) number of plans, studies and systems carried out/executed under the project following an integrated approach.⁹

⁸ The National Social Assistance Policy (PNAS) states that "vulnerability to poverty is related not only to economic factors and specific individual characteristics, but also to family arrangements and life cycles". The IDF is based on data from the Federal Governments' Social Programs Registry (*CadÚnico*). It is calculated for each registered family in *CadÚnico* (IJSN, 2010).

⁹ Plans, studies and systems described under components 1, 2 and 3 that have the participation of three or more institutions of the state, federal and/or municipal governments, as well as civil society.

III. PROJECT DESCRIPTION

A. Project Components

21. The proposed project will finance four components described below (for further details see Annex 2).

22. Component 1: Integrated Water Management and Disaster Risk Management (US\$59.5 million, of which US\$44.6 million IBRD). To improve water resource management and metropolitan coordination and planning mechanisms for the management of urban water, and develop adequate planning and monitoring instruments for risk reduction as well as preparedness and response to adverse natural events.

23. This will be achieved by: (a) developing a State Water Resources Management Plan; (b) Developing and/or revising River Basin Management Plans for the River Basins; (c) Strengthening the State's hydrological and water quality monitoring network and institutional capacity; (d) strengthening coastline management by implementing a coastline modeling system; (e) mapping groundwater resources by developing an online platform for individual self-reporting of well and groundwater usage in the Borrower's territory; (f) Strengthening SEAMA by (i) developing a state environmental management plan, (ii) providing training on environmental and water resources management and on integrated urban water management, (iii) developing studies on, and designs for, the development of an environmental management information system, and (iv) acquiring equipment for SEAMA's environmental management information system; (g) strengthening the State's capacity in formulating state and municipal public policies in integrated urban water management in the GVMR; (h) strengthening the State's disaster risk management capacity by, inter alia, (i) developing methodologies and guidelines for assessing hazard, vulnerability and risk, (ii) developing guidelines for incorporating risk into territorial planning and public investments, including the carrying out of workshops, (iii) designing and implementing an integrated information system to identify and monitor risks, (iv) strengthening the State Civil Defense System and the State Monitoring and Alert Center, and (v) establishing an integrated operations center.

24. Component 2: Efficient Water Supply Services and Increased Access to Sanitation (US\$215.6 million of which US\$141.5 million IBRD). To increase the efficiency of water supply services and the coverage of sewage collection and treatment services in the Borrower's territory by, *inter alia*: (a) developing an operational efficiency strategic plan for CESAN; and (b) carrying out: (i) sewerage investments for wastewater collection and treatment in Selected Urban Areas, and (ii) household sewerage connection program, including supervision.

25. Component 3: Watershed Management and Restoration of Forest Cover (US\$23.6 million of which US\$14.5 million IBRD). To improve the quality of surface and coastal waters through coordinated interventions in selected watersheds by, *inter alia*: (a) inducing land use change in selected watersheds by supporting and extending implementation of, and strengthening the State's capacity in implementing *Reflorestar*,¹⁰ and (b) implementing the Mangaraí River Pilot aimed at reducing sediment load originating in the Mangaraí River sub-watershed by

¹⁰ *Reflorestar* was developed with the support of the Biodiversity and Watershed Conservation and Restoration Project (*Florestas para Vida - P094233*), currently under implementation. The program uses a Payment for Environmental Services (PES) scheme to provide payments for reforestation, followed by longer-term payments for forest conservation, as well as short-term payments for the adoption of environmentally-friendly productive land uses such as agroforestry or silvopastoral practices.

combining reforestation and improved land management (through *Reflorestar*) with interventions that include improvements to roads' construction, operation and management, as well as to water supply, sanitation and solid waste in the Mangaraí River sub-watershed, including impact evaluations of selected interventions.

26. *Component 4: Project Management, Supervision and Institutional Strengthening (US\$23.8 million of which US\$23.8 million IBRD)*. Activities under this component relate to the institutional support and strengthening the State's capacity in Project management and implementation, including the provision of training and technical assistance for the carrying out of activities associated with Project execution, monitoring and evaluation of the Project and the provision of technical, administrative and financial management support for Project supervision. This component will also strengthen the capacity of Espírito Santo's Regulatory Agency for Water, Sanitation and Road Infrastructure (ARSI) by developing an economic and financial regulatory model for water supply and sewerage services.

B. Project Financing

27. **Lending Instrument.** The lending instrument will be Investment Project Financing Loan (IPF) in the amount of US\$225 million to the State of Espírito Santo with a guarantee from the Brazilian Federal Government.

28. **Project Cost and Financing.** The total project cost is US\$323.10 million. The Borrower will provide US\$98.10 million in counterpart funding. Project costs include physical and price contingencies.

Project Components	Project cost (US\$ million)	IBRD Financing (US\$ million)	% Financing
1. Integrated Water Management	59.5	44.6	75%
2. Efficient Water Supply Services and Increased Access to Sanitation	215.6	141.5	66%
3. Watershed Management and Restoration of Forest Cover	23.6	14.5	61%
4. Project Management, Supervision and Institutional Strengthening	23.8	23.8	100%
Total Project Costs	322.5	224.4	70%
Front-End Fees	0.56	0.56	100%
Total Financing Required	323.10	225.00	70%

C. Lessons Learned and Reflected in the Project Design

29. The World Bank's worldwide experience in the water sector, as well as long-term involvement in the water resources management and water supply and sanitation sectors in Brazil and in the SES have provided valuable lessons, which are reflected in the proposed Project's design. Among the lessons incorporated in the Project's design are the following:

30. *Integration in implementation arrangements.* The implementation arrangements used in previous Bank operations in the SES brought together a number of State Secretariats in Espírito Santo and improved cross-sectorial integration. They evolved as a result of the State's implementation experience through the long-term partnership established with the Bank since 1994. These arrangements also mainstreamed social and environmental sustainability amongst representatives of both the State Government and project executing agencies. Sustainability is also emphasized in the design of the proposed operation, which will use a comprehensive

approach including water resources management, sewage collection and treatment as well as reforestation. The arrangements to be used in the proposed operation will build on this model and this emphasis.

31. Connecting households to the sewerage network. Connections to sewerage networks will be included in the works contracts that are installing the network, and related social and communication activities will be put in place before and during construction, as well as when collection and treatment works are initiated. For Brazil in particular, where households are required to connect once the network is available, in addition to a solid communication effort, partnership with local governments is critical, since responsibility for enforcing connections (and the political will needed for enforcement) lies with them. In addition, a social tariff and the provision of subsidies to connect low-income households are particularly important to realize the environmental and health benefits arising from access to sanitation.

32. Payment for Environmental Services (PES). The Project draws on the experience of previous projects that have implemented PES approaches, including Costa Rica's *Ecomarkets and Mainstreaming Market-based Instruments for Environmental Management*, Mexico's *Environmental Services*, and *Regional Integrated Silvopastoral Ecosystem Management* and the *Espírito Santo Biodiversity and Watershed Conservation and Restoration (Florestas para Vida)* Project, on a review of lessons from PES programs in Brazil,¹¹ and on other PES experiences worldwide. In addition to numerous detailed lessons on PES mechanism design, the broad lessons of these previous efforts that are applicable to this project include: (i) clearly identifying the specific needs of service users in the watersheds (in this case, reducing sediment loads in CESAN's water sources), and (ii) clearly establishing which land uses, in which areas, can help generate the specific services needed by the water users (this analysis was undertaken during the implementation of the *Florestas para Vida* Project).

33. The inclusion of disaster risk management aspects in this operation has taken into account the lessons learned from previous global disasters and lessons from 25 years of Bank operations and programs in the area of disaster risk management. The World Bank Independent Evaluation Group (IEG) report, "Hazards of Nature, Risks to Development: An Evaluation of World Bank Assistance for Natural Disasters" (2005), recommends that the Bank assist its clients most vulnerable to natural disasters to shift from focusing entirely on disaster response to implementing programs and policies for comprehensively managing disaster risk.

34. Turnkey contract approach. The design, build and operate ("turnkey") contract model was used in the execution of most works in the previous operation¹² in Espírito Santo and proved to be robust and effective. The following advantages compared to traditional individual contracts, were observed during implementation:

- Allocating a larger part of the responsibilities onto the contracted firm along with a certain technical autonomy can be attractive to firms of quality with proven capacity to tolerate risks, to furnish performance securities, and to comply with the established targets;
- This type of contract can also lead to faster execution of works, particularly in terms of resolving implementation problems: the contract model provides an incentive to the firm to resolve issues rapidly, and fewer contract amendments are necessary. In the previous

¹¹ Pagiola, S., H. Carrascosa von Glehn, and D. Taffarello (Eds.). 2012. *Experiências de Pagamentos por Serviços Ambientais no Brasil*. São Paulo: Secretaria de Estado do Meio Ambiente.

¹² The Espírito Santo Water and Coastal Pollution Management Project (P087711), US\$107.5 million.

operation in Espírito Santo, amendments to turnkey contracts, even though they were more complex technically, were on average 3.7 times inferior in terms of time and 4.6 times inferior in terms of cost when compared to amendments in traditional¹³ contracts.

35. *Water resources management* interventions should consider water quality improvement objectives and interventions to be adopted among sector agencies (e.g., water supply and sanitation, urban development, agriculture, among others) combined with local participatory strategies at the watershed level. The Project will support the expansion and integration of the SES's water quality and quantity monitoring network as well as the development of river basin management plans with river basin committees and work with local producers to focus on improving land use in watersheds to improve water quality for downstream water users.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

36. Project implementation arrangements will build on the lessons learned from past operations in water and sanitation in the SES which proved to be robust and effective at meeting objectives in a timely and efficient manner. These arrangements will rely on: (i) the oversight of a Project Steering Committee (*Comitê Diretivo do Projeto*), (ii) the State Secretariat of Government (SEG), which has been designated as the Project Implementing Entity, responsible for institutional project coordination, (iii) an Overall Coordination for Project Execution (C-GIP), will function under SEG and be responsible for the overall project implementation, (iv) an independent Project Management Unit (*Unidade de Gerenciamento do Projeto*, UGP), comprising a project Operational Supervisor with support from three Core Thematic Groups (CTG), an Administrative-Financial Management sub-unit and an Environmental and Social Supervision sub-unit. Each CTG will coordinate activities on behalf of each institution involved which will help facilitate and operationalize inter-sectoral planning. Annex 3 explains these arrangements in more detail.

B. Results Monitoring and Evaluation

37. Overall responsibility for monitoring and evaluation (M&E) of the Project will lie with the C-GIP, which with support from UGP will consolidate all reports and provide timely information about its progress and execution to the Bank, including qualitative and quantitative information on the execution of selected interventions, procurement and contractual decisions, accounting and financial recording and other operational and administrative matters. The UGP will be assisted by other institutions involved in the execution of the Project and specialized consultants, as required. The Project's Operational Manual will provide specific details regarding monitoring and evaluation responsibilities, including data collection requirements and timing.

38. CESAN will be responsible for reporting on the indicators related to the company's operational performance and on the quality of service provision, while SEAMA will continue to monitor water quality and coastal pollution, on a weekly basis, through a water quality sampling network in the main hydrographic basins of the state and a coastal pollution sampling network on 46 beaches along the state coast (totaling 71 sampling locations). This information will be reported to the Bank every six months.

¹³ A "traditional" contract refers to a contract using standard unit prices.

39. The Mangaraí pilot project also benefits from the distributed hydrology model developed under the *Florestas para Vida* Project. This model responds dynamically to climate, vegetation changes, and soil moisture conditions and will be used to model the effects of land use change on water services that affect downstream water users. SEAMA will be responsible for sharing the results of the modeling exercises with CESAN and the Bank. Details on M&E arrangements are provided in Annex 3 (Implementation Arrangements).

C. Sustainability

40. The proposed project is part of a long-term program that has evolved since 1994, and was able to successfully put in place and solidify internal and external incentives at the sector and utility levels, which are critical for sustaining the Project's main objectives and benefits. This project will build on the last operation's achievements in making a significant contribution to the sustainability of environment, water and sewerage services in Espírito Santo, particularly in developing a strong partnership between SEAMA and CESAN.

41. The activities financed under the Integrated Water Management Component will be targeted to those stakeholders that have a direct role in ensuring the sustainability of the interventions and can contribute to building up the physical and institutional basis for sustained integration in the strategic planning and policies concerning water resources, water infrastructure and the environment.

42. An important part of the sustainable land management practices supported by the Project are expected to be win-win — that is, to be not only environmentally beneficial but also in the farmers' own interest, so that they will continue to maintain them once the support provided by the Project ends.¹⁴ To ensure that this is the case, technical assistance will help farmers adopt practices that are best suited to their conditions and to implement them effectively, thus ensuring that the benefits they derive from them are as high as possible. This is important because initiatives such as silvopastoral practices and organic farming have the potential to be highly productive if well implemented, but can be marginal if implemented poorly. These extension services will also include specific work with women in the target communities to not only improve their skills to market their products, but also train them on rights and citizenship issues in the effort to empower them economically and socially.

43. The creation of the State Fund for Water Resources (Fundágua) in 2008, gave the State water resources policy an instrument to secure and apply funds to improve management of water resources and the environment. These funds, executed by SEAMA, come from petroleum royalties and contribute to the long-term availability of resources to be applied in PES programs, including the one supported by the Project.

44. *Climate Change Adaptation and Mitigation Co-Benefits.* The Project will finance activities with climate change co-benefits in that it will support (i) improving water resource management, particularly in the areas of planning and monitoring to allow for the integration of policies concerning water resources, water infrastructure and the environment; (ii) establishing early warning and disaster assessment systems; (iii) developing a comprehensive operational efficiency strategic plan for CESAN, including water loss reduction; as well as (iv) sustainable

¹⁴ In some cases, reducing sediment loads may require adoption of practices that are less profitable for farmers than available alternatives. To address such cases, *Reflorestar* offers long-term payments that compensate farmers for the opportunity cost of adopting the conservation practice.

land management practices and watershed function restoration through the *Reflorestar* Program as well as through the Mangaraí River Pilot project combining reforestation and improved land management, which will also contribute to increasing vegetative cover.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Stakeholder Risk	Moderate
Implementing Agency Risk	
- Capacity	Moderate
- Governance	Moderate
Project Risk	
- Design	Moderate
- Social and Environmental	Low
- Program and Donor	Low
- Delivery Monitoring and Sustainability	Moderate
Overall Implementation Risk	Moderate

B. Overall Risk Rating Explanation

45. The risk rating for implementation of the Project is “Moderate”, given the State’s commitment to the Project, its current institutional capacity and the relatively high level of integration among State institutions (which will help facilitate implementation), as well as proven experience with Bank projects. The main implementation risks identified in the ORAF matrix are:

46. Agreement within the State Government’s key agencies/secretariats and with municipalities in the GVMR on adequate arrangements for integrated water management may not be reached. The Project will work with the SES to establish adequate governance frameworks and coordination mechanisms for metropolitan management of urban water issues such as drainage and water resources, across sectors and with the municipalities involved. The different agencies within the SES already possess a relatively high degree of integration and coordination, so seeking integration at the municipal level poses the greater challenge. The Steering Committee will have representatives from each of the key sector secretariats and, through SEPAM, will coordinate with the GVMR Metropolitan Council (COMDEVIT), which has representation from the municipal level. Close follow up to technical assistance activities will ensure that diagnostics and proposed alternative arrangements have solid technical justifications, draw on best practice experiences, and the Steering Committee will be in charge of coordinating discussions with the different stakeholders to reach a satisfactory agreement.

47. The lack of up-front buy-in from households in connecting to the sewerage network increases the chances of a low rate of connection and of achieving key project results. CESAN recently experienced a gap between network availability and the rate of connection, and has used a number of approaches to deal with this issue. The company now has a specific division dedicated to improving communication related to connecting to the sewerage network with households and accelerating connections to the sewerage networks being delivered and under construction. This division was able to mobilize funding from the SES to subsidize connection costs¹⁵ to low income households and has created a multi-faceted program to scale-up the

¹⁵ The connections mostly refer to in-house connections and related work and plumbing (grease traps, for example) and CESAN currently estimates connections to cost on average approximately R\$1,000.

communication efforts with the community in order to increase the rate of household connections to the network and promote the health and environmental benefits of doing so.

48. Although the State has experience in implementing World Bank Projects, *the number of integrated/cross-sector activities to be undertaken and the level of scaling up in the PES activities may result in delays related to procurement, financial audits and processing of contractual documents and financial transactions*. The Project's implementation arrangements, financial management and procurement aspects will be clearly reflected in the Project's operational manual. In addition, as successfully done in previous Bank operations, these aspects will benefit from the support of a project management and engineering consulting firm, who will provide support to the UGP in preparing bidding documents and reporting on fiduciary issues. As for the PES activities, the project cycle has been clearly identified as well as the respective roles, responsibilities and the level of support needed by the agencies involved.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analyses

49. The economic analysis shows that Components 2 and 3 are likely to generate benefits well in excess of their costs, and that Component 1 will position the SES to substantially reduce the impacts of possible future disasters and better manage its water resources. Component 2 has a net economic benefit of US\$139 million and an internal rate of return of 34 percent, while Component 3 has a net economic benefit of US\$13 million to US\$18 million and Internal Rate of Return (IRR) ranging from 12.7 to 16.8 percent.

50. Water system consumers are the main beneficiaries of Component 2, with improvements in health, increase in labor productivity, and appreciation of property value substantially exceeding the higher tariff rates they will have to pay. Water consumers also benefit indirectly from Component 3 from avoided increases in treatment costs (which may result in higher water tariffs). Landholders are the other main beneficiaries of Component 3, primarily through higher income from more productive practices.

51. The bulk of investment costs will fall on the SES. The long-term financial costs of operating the additional water infrastructure will fall on CESAN, but projected revenue increases are more than sufficient to cover these added costs. The long-term costs of conservation payments represent a small fraction of Fundágua's annual budget. Additional details of the analysis can be found in Annex 6.

52. A financial analysis of CESAN was undertaken to evaluate its financial capability of sustaining and operating the Project. This assessment differs from the financial analysis of the Project as it takes into account not only the Project, but also all other operations that CESAN is planning to implement. The evaluation of CESAN's financial statements in the last five years shows a sound financial situation, and the financial projections show that revenues will increase in real terms due to: (i) a new tariff structure approved by ARSI, which will be fully implemented by 2014, and will result in a 26 percent real increase in the sewerage tariff; and (ii) an investment plan that will expand sewerage coverage and maintain universal coverage in the water service. As a consequence, sewerage revenues are expected to increase by 54 percent and total revenues by 16 percent. Cost recovery will maintain its current level of about 120 percent, covering all operating costs plus 20 percent to fund investment costs. The capital structure will

show a sound position with debt participation of 30 percent of assets and equity 70 percent. Additional details of the analysis can be found in Annex 6.

B. Technical

53. The proposed project relies on approaches, methodologies, technical designs and technologies appropriate for the Brazilian context and no significant technical obstacles are expected during implementation.

54. *Integrated Water Management and Disaster Risk Management.* Activities proposed will address some of the key constraints faced by the SES. Terms of reference for a number of the activities financed under this component have been reviewed and take into account best practices from similar experiences in Brazil. For example, the River Basin Management Plans will establish the allocation parameters for the cities, which are users of the basin since they consume water and discharge effluents into the basins, and will also identify and prioritize water resources infrastructure works needed for the management of the basins. They will analyze the source of different pollutants and contemplate adoption of alternative solutions (such as combined or non-combined systems, reuse of treated effluents, utilization of new technologies, risk management approaches, etc.). Its development process will include a series of events for technical and social discussions of key issues (some of which already mentioned), which would serve as a catalyzing force for new solutions, as well as adherence and ownership of stakeholders.

55. *Efficient Water Supply Services and Increased Access to Sanitation.* The rehabilitation and construction works will follow the Brazilian standards for system dimensioning and the standards of quality of the National Environmental Council (CONAMA) for effluent discharged and sludge disposal, including continuous monitoring of treated wastewater and sludge reuse, which are in line with the IFC/World Bank Group Environmental, Health and Safety Guidelines for Wastewater and Environmental Water Quality.

56. Engineering designs and associated estimated costs for sewerage works were reviewed during preparation. Variations in costs per capita per municipality can be attributed to: (i) topography (which influences the number of pumping stations required); (ii) population density; (iii) the state of the existing roads along which pipes will be laid (i.e., requiring work on paved or dirt roads, repaving, etc.); and (iv) the presence of rock beds in the areas where pipes are to be laid, requiring additional work and equipment. These per capita costs are comparable with costs from previous contracts in the Bank's previous Espírito Santo Water and Coastal Pollution Management Project in the SES, adjusted for inflation.

57. The suggested wastewater treatment technology (Upflow Anaerobic Sludge Blanket, UASB) for most of the new systems to be built or rehabilitated is appropriate for Brazilian climatic conditions. This technology was selected during the design process particularly for its low operating costs with regards to energy consumption and for the experience that CESAN has with operating these systems in both urban and rural areas.

58. *Watershed Management and Restoration of Forest Cover.* The Project is appropriate for the needs of the SES and will address constraints the government is attempting to overcome in maintaining water quality and environment conservation. The Project builds on the interests and actions of the government, utilities, municipal governments, and NGOs to further develop an environmental service market to reduce watershed degradation as well as threats to globally important biodiversity from agricultural production systems and increase habitat for species in

key rainforest watersheds of the Atlantic Forest. The PES scheme is an innovative approach that draws on several operational examples, including national programs in Costa Rica and Mexico and programs in other Brazilian states.

C. Financial Management

59. A Financial Management assessment was carried out in accordance with Bank guidelines. The financial management risk associated with the Project has been assessed as “Moderate” mainly due to the following factors: the involvement of a high number of agencies and secretariats in project implementation that can make it difficult to exercise the proper oversight and control of project execution, the dependency on State Secretariat of Finance (SEFAZ) to transfer the resources and the non-integration of the Financial and Physical Monitoring System (SAFF) with the Integrated Administrative and Financial State and Municipal System (now SIAFEM and in the future SIGEFES).

D. Procurement

60. Procurement for the proposed project will be carried out in accordance with the World Bank’s “Guidelines: Procurement under IBRD Loans and IDA Credits” dated January 2011; and “Guidelines: Selection and Employment of Consultants by World Bank Borrowers” dated January 2011 and the provisions stipulated in the Legal Agreement. A Procurement Plan acceptable to the Bank was prepared and will be updated at least annually, or as deemed necessary. Template bidding documents for International Competitive Bidding, National Competitive Bidding and Request for Proposal documents will be made available online on the Implementing agencies’ website.

61. As the procurement arrangements established for the previous Bank-financed Espírito Santo Water and Coastal Pollution Management Project (P087711) have worked well, it is proposed that the same type of organizational procurement structure be adopted in this project. In this sense, the State Secretariat of Government (SEG), the Special Bidding Commission (*Comissão Especial de Licitações*, CEL), the UGP and its CTGs led by CESAN, SEAMA and INCAPER will be the entities with procurement responsibilities.

E. Social (including Safeguards)

62. The Project will likely bring positive social impacts to the State by increasing access to sanitation, and improving the State’s capacity for better integrated water management, which includes aspects related to DRM. In order to ensure regular consultations with key stakeholders and periodic communication of project activities and results, the Project’s Environmental Management Plan (EMP) includes the elaboration of a communication plan to be implemented during construction, which will draw on the existing procedures of CESAN and the State, such as their customer service/citizen call centers and complaint hotlines. In addition, the State and CESAN will continue to act transparently, periodically disseminating operational, economic, financial, environmental and social indicators, as well as project results to the public.

63. In the areas where sewerage investments are being undertaken, the Project will also support the implementation of a socio-environmental plan for wastewater collection system connections in support of CESAN’s “Connect to the Network” Program (“*Se Liga Na Rede*”) to scale-up the rate of household connections to the sewerage network (particularly low-income households) and promote the health and environmental benefits of connecting to the network.

64. Women in urban areas of Espírito Santo are better off in terms of educational outcomes than those in rural areas, and men in rural areas are the most disadvantaged.¹⁶ While they have closed the education gap, as they have better educational outcomes than men (in line with the overall trend for Brazil), these gains have not yet translated into equal work opportunities. Women in both urban and rural Espírito Santo are more likely to be economically active if compared to Brazil averages, but still lag behind their male counterparts: in urban areas, 55.2 percent of women are economically active and this share increases to 57.4 percent for rural women, compared with 71.7 and 80.3 percent of males.

65. The Project will build on INCAPER's participatory approach to produce local diagnostics and hold focus group meetings with women in the Mangaraí River pilot region to develop a primary diagnosis and understanding of gender dynamics, especially with regards to different needs and interests of women and men; helping plan concrete initiatives suited to the specific needs of men and women. The Project will support implementation of training aimed to empower women economically (e.g., overseeing programs/activities designed to add value to products, business-related skills, basic market analysis skills), paired with training on citizenship and rights, aimed at empowering women socially.

66. *Involuntary Resettlement (OP/BP 4.12)*. As part of the social assessment, the Bank reviewed the main civil works identified for implementation under the Project and found that no involuntary resettlement of households will take place. However, land acquisition and easements will be required for wastewater treatment and collection works, as well as for potential drainage works. As such, a resettlement plan and a resettlement framework have been prepared, respectively, for the works already identified, and to guide any future resettlement in the case it becomes necessary.

F. Environment (including Safeguards)

67. The Project is expected to promote several environmental benefits as the interventions related to the expansion of wastewater service are expected to lead to an increase in sewage collection with health and environmental benefits both for local residents along polluted waterways and for the users of Espírito Santo's beaches more generally.

68. The Project is classified as Category B, and an Environmental Impact Assessment (EIA), which includes an EMP, was prepared in accordance with the World Bank's Environmental and Social Safeguards Policies. In addition, an Environmental Management Framework (EMF) guides the works and activities that will be further detailed and identified during implementation (including studies and policy work), as well as provide good practices and procedures for treatment of Quilombola communities in accordance to national and local legislation.¹⁷ Three public consultations were carried out from May 20 to 22, 2013 (one in the GVMR, one in Caparaó and one in the Santa Maria and Jucu river basins). Draft final versions of the EIA, EMF, resettlement plan and resettlement framework were made available to the public 10 days before the public consultation.

¹⁶ Data from the 2009 and 2011 national household surveys (PNAD) conducted by the Brazilian Institute of Geography and Statistics (IBGE).

¹⁷ There is one Quilombola community in the Mangaraí sub-basin that may be a project beneficiary. Quilombola communities do not meet the criteria to be considered indigenous communities for the purposes of the Bank's Indigenous People Safeguard Policy - OP/BP 4.10.

69. No potential large scale, significant and/or irreversible impacts have been identified. The impacts considered most relevant are those related to (i) sewerage systems (Component 2), and (ii) the increase of forest cover and recovery of Areas of Permanent Protection (APP) (Component 3). In both cases, activities are expected to generate positive impacts and outweigh the negative impacts associated with the implementation phase of works (impacts are localized, small scale, temporary and are controlled and mitigated with the help of the EMP) and during operation of the systems.

70. The EMP covers the following thematic programs: (i) project-specific environmental and social management plan that includes mitigation measures for the specific investments as needed, definition of implementation responsibilities during the construction and operation phases, monitoring arrangements, and implementation schedule with adequate budget; and (ii) sludge management that includes short- and long-term solutions for the treatment, disposal and reuse of sludge generated from the wastewater treatment plants. Furthermore, included in the provisions of the EMP is the adoption of an Environmental Construction Manual during the construction of the planned works. This manual is included in the bidding process for all works, and the adoption of the adequate environmental practices established in the manual is deemed a contractual obligation to be fulfilled by the contracted companies.

71. Natural Habitats (OP/BP 4.04). Preliminary assessments of the wastewater collection and treatment works as well as other planned interventions indicate that natural habitats will not be adversely affected by the Project. Sewerage interventions will not be conducted in protected areas. Certain sections of the systems fall in APPs; the impacts on these areas will be minimized by the adoption of guidelines as specified in the Environmental Construction Manual, which forms part of the EMP. Because they are considered to be of public utility, the interventions are subject to licensing by State Institute of Environmental and Water Resources (IEMA). Although specific areas of reforestation have not yet been identified, they may include protected areas and are expected to have a positive impact on natural habitats. As established in the EMP, only native species of the Atlantic forest will be used in the reforestation interventions. Some specific interventions may also take place in APPs and will aim at recuperating and restoring them.

72. Forests (OP/BP 4.36). The Project will support management of forests, as it will include reforestation of approximately 3,850 hectares of forest in selected river basins and a pilot demonstration unit linking the recovery of forests and the quality of water sources. Interventions are expected to have a positive impact, contributing to 12 percent of the goal set by the State-wide reforestation Program for 2014. As established in the EMP, only native species of the Atlantic forest will be used in the reforestation interventions.

73. Pest Management (OP 4.09). Since Component 3 will deal with the generation of opportunities and revenue for rural producers, it was noted during the preparation of the EIA that forest cover restoration activities will use low toxicity herbicides and formicides for pest management (mostly ants) during the seedling planting phase of the program. An Integrated Pest Management Plan was prepared and is an integral part of the EMP. The assessment also indicates that the Project is unlikely to require the purchase, application or storage of pesticides and will not lead to an increased use of pesticides. No pesticides for rodent control will be necessary under flood control, drainage or reforestation initiatives.

G. Other Safeguards Policies Triggered

74. Physical Cultural Resources (OP/BP 4.11). Brazil has a well-developed legislative and normative framework for management of physical cultural property. Although no impact on Physical Cultural Resources (PCR) is expected, "chance find procedures" for PCR are included in the EMP to safeguard against potentially impacting physical cultural property during implementation.

Annex 1: Results Framework and Monitoring

BRAZIL: Espírito Santo Integrated Sustainable Water Management Project

Project Development Objective (PDO): The project development objectives (PDO) are to improve sustainable water resources management and to increase access to sanitation in the State of Espírito Santo.

Indicators	Core	Unit of Measure	Baseline	Cumulative Target Values**					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)
				YR2	YR3	YR4	YR5	YR6				
PDO Level Indicators												
BOD pollution loads removed by activities supported under the project	☒	tons/year	0	-	-	680	780	1,590	Annual	CESAN	CESAN/UGP	Reduction in Biochemical Oxygen Demand (BOD) pollution loads resulting from Component 2 investments ¹⁸
Population in urban areas provided with access to “improved sanitation facilities” under the project	☒	#	0	-	20,000	50,000	80,000	164,485	Annual	CESAN	CESAN/UGP	Cumulative number of people that will have access to a sewerage connection as a result of project investments
Number of plans, studies and systems carried out/executed under the project following an integrated approach	☐	#	0	0	1	4	6	9	Annual	UGP	UGP	Plans, studies and systems described under components 1, 2 and 3 that have the participation of three or more institutions of the state, federal and/or municipal governments, as well as civil society. ¹⁹
Beneficiaries: Direct project beneficiaries.	☒	Millions of people	0	0	0.06	0.81	0.93	2.63	Annual	UGP	UGP	Direct beneficiaries are people or groups who directly derive benefits from an intervention.
INTERMEDIATE RESULTS												
Component 1: Integrated Water Management												
Intermediate Result: Improve the State’s capacity for and efficiency in managing its water resources and mainstream disaster risk management												

¹⁸ The BOD pollution loads were calculated using (i) influent BOD concentrations as sampled and measured by the engineering firms in charge of the designs, as well as (ii) estimated influent sewage flows and (iii) average BOD removal efficiencies of 90 percent for both the “integrated UASB” and activated sludge processes.

¹⁹ Potential activities to be measured by this indicator -- (i) state water resources management plan, (ii) 3 river basin management plans, (iii) hydrological and water quality monitoring network, (iv) coastline modeling system, (v) mapping of groundwater resources, (vi) drainage master plan for the GVMR, (vii) development of methodologies and guidelines for hazard, vulnerability and risk assessment, (viii) involuntary resettlement framework for immitigable risks, (viii) integrated operations center, (ix) updating of CESAN’s water master plan, (x) impact evaluation of the Mangaraí pilot.

Indicators	Core	Unit of Measure	Baseline	Cumulative Target Values**					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)
				YR2	YR3	YR4	YR5	YR6				
Percentage of territory within the State of Espíritu Santo covered by timely and accurate warning for hydro-meteorological events	<input type="checkbox"/>	%	0	-	-	-	20%	70%	Annual	SEAMA	SEAMA/UGP	
Percentage of territory within the State of Espíritu Santo monitored by the hydromet network	<input type="checkbox"/>	%	30%	-	-	40%	55%	60%	Annual	SEAMA	SEAMA/UGP	
Percentage of coastal development projects licensed using the coastal management model developed under the project	<input type="checkbox"/>	%	0	-	15%	30%	60%	100%	Annual	SEAMA	SEAMA/UGP	
Component 2: Sewage Collection and Treatment												
Intermediate Result: Increase the coverage of sewage collection and treatment services in the State												
CESAN's operating ratio remains ≤ 0.90	<input type="checkbox"/>	#	0.85	≤ 0.90	≤ 0.90	≤ 0.90	≤ 0.90	≤ 0.90	Annual	CESAN	CESAN/UGP	The operating ratio is the division of the company's operating expenses by its operating revenues.
New household sewer connections constructed under the project	<input checked="" type="checkbox"/>	#	0	-	4,000	10,000	16,000	32,897	Annual	CESAN	CESAN/UGP	Cumulative number of piped household sewerage connections built under the project.
Component 3: Watershed Management and Restoration of Forest Cover												
Intermediate Result: Increase forest cover and the use of sustainable land management practices												
Area restored or re/afforested	<input checked="" type="checkbox"/>	Hectares	0	-	-	500	1,000	2,000	Annual	SEAMA	SEAMA/UGP	Cumulative area that is covered by the payment for environmental services for conservation and/or reforestation
Land area where sustainable land management practices have been adopted as a result of the project	<input checked="" type="checkbox"/>	Hectares	0	-	-	300	800	1,850	Annual	SEAMA	SEAMA/UGP	Cumulative area that is covered by the payment for environmental services for improved land management practices
Number of women participating in training aimed at economic and social empowerment under the Mangará River pilot project	<input type="checkbox"/>	#	0	30	50	100	150	150	Annual	INCAPER	INCAPER/UGP	

Annex 2: Detailed Project Description

BRAZIL: Espírito Santo Integrated Sustainable Water Management Project

1. The project has been designed to go a step beyond previous Bank partnerships with the SES to achieve enhanced and more equitable access to sanitation services and support a move towards a long-term, innovative approach to integrated water management. This entails having a whole landscape outlook to water management, through strengthening stakeholder institutions, as well as developing instruments, mechanisms and institutional arrangements (if needed) that foster coordination of policies, planning and interventions/investments across sectors (water supply and sanitation, agriculture, urban, environment, water resources management) as well as across different levels of government (federal, state, municipal). Table A2.2 presents the project costs by component.

2. *Component 1: Integrated Water Management and Disaster Risk Management (US\$59.5 million, of which US\$44.6 million IBRD).* This component supports activities aimed at (i) improving water resource management, particularly in the areas of planning and monitoring to allow for the integration of policies concerning water resources, water infrastructure and the environment, including the institutional strengthening of SEAMA; (ii) improving metropolitan coordination and planning mechanisms for the management of urban water; and (iii) developing adequate planning and monitoring instruments for risk reduction as well as preparedness and response to adverse natural events. The lead entity for the activities related to water resources management will be SEAMA, while CESAN will lead the activities related to urban water management.

3. *Water Resources.* The Project will finance the development of a *State Water Resources Management Plan (US\$3.1 million)*, which will have an expanded scope than what is traditionally done in Brazil and will establish strategic objectives for the water resources sector and is aligned with the SES's Economic and Social Development Plan. The Plan will identify critical areas and specific regional needs, such as those in water infrastructure, as well as identify the necessary institutional arrangements and guidelines for its execution, including the direct involvement of the State's municipalities. Although this activity will be financed by the Project, there will be coordination with the Bank-financed Federal Integrated Water Project (INTERAGUAS), throughout its development. In parallel to the development of the State Water Resources Management Plan, this component will also finance, *inter alia*, the following activities:

- a. *Development of River Basin Management Plans (US\$2.0 million).* The River Basin Management Plans will identify and target priority investment needs for water infrastructure as well as develop water allocation scenarios for each studied river basin. The Project will finance the development of River Basin Management Plans for at least three individual river basins which do not already count on existing plans (São Mateus, Itaúnas and Itapemirim) and will finance the revision of existing plans (as needed), in order to harmonize the methodology used, particularly in terms of the categorization of actions (short-, medium- and long-term actions) and prioritization of investments. Water body classification studies will be prepared as part of the River Basin Management Plans to classify water bodies according to their current level of development and sensitivity to

development, in order to provide a range of protection, restoration, and enhancement strategies as well as various management actions and allow the management plans to be tailored to the needs of the resource as well as the priorities of the community.

- b. *Strengthening the State's Hydrological and Water Quality Monitoring Network and Institutional Capacity (US\$7.0 million).* The SES's existing hydrological monitoring network is currently limited to two hydrological monitoring stations (operated by SEAMA) which complement the National Water Agency's (ANA) network of 41 hydro-meteorological stations in the State. SEAMA also oversees the Water Resources Quality Monitoring Network which collects data on freshwater quality in the State's main river basins and on coastal pollution on 46 beaches along the state coast (totaling 71 sampling locations). To complement these existing networks, the Project will finance, *inter alia*:
 - i. Hydrological Network: the expansion and upgrading of the hydrological monitoring network, in order to collect valuable data on precipitation and water levels for the water resources planning and management process and provide the SES with an increased capacity to prepare and plan for adverse hydrological events such as floods and droughts. This will require, *inter alia*, the acquisition and installation of 34 automatic pluviometric and fluviometric monitoring stations, 53 limnimetric rulers, as well as related training, vehicles and office equipment, and development of a database and website to disseminate the current information on water quality and quantity.
 - ii. Water Quality Network: the expansion of the existing Water Resources Quality Network's capacity to monitor the State's water sources and coastal pollution for water resources planning, by establishing a Water Quality Analyses Laboratory within SEAMA, as well as capacity building activities aimed at strengthening environmental and water resources management. This will require, *inter alia*, the preparation of the architectural, structural, electrical and electronic designs for the laboratory, as well as its construction, acquisition of software for the laboratory's information and quality control systems and equipment for water quality analyses, and reagents storage facilities.
- c. *Strengthening Coastline Management (US\$3.8 million).* Espírito Santo's 1,140 kilometers of coastline have recently seen significant growth in port-related activities, real estate and tourism, which has put pressure on the coastal environment, particularly in terms of contributing to increased coastal erosion. The Project will support the implementation of a coastline modeling system (*Sistema de Modelagem Costeira – SMC*), a model-based decision-making tool which relies on topographic and bathymetric data as well as on information on ocean dynamics (ex.: currents, waves, tides and winds). This tool will help the State better understand the causes and the current and future impacts of increased coastal erosion, as well as help with the definition of coastal planning guidelines and environmental licensing. The software for this model is already available to the State via a cooperation agreement with the Government of Spain. More specifically, the Project will finance, *inter alia*, (i) the analysis and processing of available coastal aerial and high resolution satellite images for at least three different time periods in order to develop coastline evolution maps, (ii) topographic surveys of 16

beaches along the SES coast and beach sediment analyses, along a period of three years, (iii) the collection of bathymetric data along the SES coast for depths between 0 and 15 meters, along a period of three years, (iv) the collection of data on ocean dynamics at three locations along the SES coast (Anchieta, Serra and Linhares), along a period of one year and (v) the calibration and validation of the coastline modeling system with the acquired data, as well as related training.

- d. *Mapping of Groundwater Resources (US\$0.6 million)*. This activity will support the development of an online platform on which citizens can self-report their usage of wells and groundwater in the SES. This platform will serve as the primary data collection mechanism for the mapping exercise and will allow the SES, in the medium- to long-term, to establish a groundwater usage regulatory framework (currently inexistent). This will also include public consultations, a communication campaign to inform the public about the program, hydrogeological data collection through selected site visits to validate the available data, as well as related training.

4. *Institutional Strengthening of SEAMA (US\$4.0 million)*. Activities under this sub-component include the elaboration of a state environmental management plan, training in environmental and water resources management as well as in integrated urban water management, studies and designs for the development of an environmental management information system, as well as consulting services and the acquisition of equipment related to the development of that information system.

5. *Integrated Urban Water Management (US\$19.1 million)*. The management of storm water and flood impacts in the GVMR is not well coordinated, particularly as it relies on drainage master plans developed independently and with little inter-municipal coordination. The Project will support technical assistance and a participatory process that will result in the formulation of state and municipal public policies, as well as capacity building in integrated urban water management in the GVMR, particularly at the municipal level. This will include the participatory development of an integrated urban water management plan, as well as a metropolitan urban drainage master plan for the GVMR, the structuring of a metropolitan institutional framework for the management of urban water, as well as preparation of detailed engineering designs and/or works identified as priority in the drainage master plan, which may include some urban requalification. Given the many issues related to water and flood management being faced at the metropolitan level on a regular basis, there is a lot of interest from all of the Municipalities that integrate the GVMR in participating in this process.

6. *Disaster Risk Management (US\$19.8 million)*. Until recently, the SES's approach to the growing number of disasters and increasing vulnerability due to urbanization was similar to that of the Federal Government, i.e., of a reactive nature, focused on disaster management. However, the SES has indicated the need to shift the focus to promoting a culture of prevention, by looking at strengthening its capacity for disaster risk management (DRM), better understanding its risk, in order to respond to disasters more efficiently.

7. The process of creating a DRM program comprises the identification of entities and coordination mechanisms to avoid redundancy in efforts and resources. The Bank and the SES are studying the different options in terms of ownership and structuring an adequate framework

for DRM in the State, and although an agency to manage the DRM program has not yet been defined given that DRM is new and involves all areas of the State government, SEAMA will take the lead in the implementation of DRM activities. It is also expected that institutions which may potentially take on this role will be identified during project implementation. More specifically, the Project will support the State's efforts in, *inter alia*:

- a. *Institutional Strengthening for DRM (US\$0.8 million)*. Supporting capacity building at the state and sectorial levels, with adequate training; development of methodologies and guidelines for hazard, vulnerability and risk assessment; development of workshops and guidelines on how to incorporate risk into territorial planning and public investments, with a focus on water and sanitation. At the same time, studies will be produced to understand the economic and fiscal impacts of disasters on the State, developing an involuntary resettlement policy framework for immitigable risks and developing guidelines for the incorporation of risk management in zoning land use planning.
- b. *Identifying and Monitoring Disaster Risks (US\$4.8 million)*. To complement the existing data sets, data acquisition campaigns will be undertaken to support the preparation of hazard, vulnerability and risk analyses and maps. It will include the acquisition and processing of geospatial data (i.e., high-resolution aerial photography, field survey, light detection and ranging remote sensing survey, etc.), and the creation of Digital Elevation Models (DEM), with a focus on urban areas. Associated DRM Plans will be prepared in two priority municipalities (Cariacica and Vila Velha) to guide investment decisions, avoid urban development in areas at risk and propose risk mitigation options. The Project will also include the design and implementation of an integrated information system which would incorporate data generated by various networks and institutions, including the Water Hydrological and Water Quality monitoring networks described above, to the State's approach to identifying and monitoring risks, using the existing State's integrated geospatial database (GEOBASES), a multi-institutional system, already in widespread use, which integrates public and private institutions of different sectors in order to populate, maintain, use and harmonize geospatial information for the SES. Data collected on water quantity and quality will be centralized and integrated with data collected by the State Monitoring and Alert Center described below. Data will form part of GEOBASES and be made available to all agencies across the State as well as to the general public.
- c. *Warning System and Disaster Preparedness (US\$14.3 million)*. This sub-component will support the strengthening of the State Civil Defense System and of the State Monitoring and Alert System. It will include the revision of the State Strategic Emergency Management Plan, the acquisition and installation of 25 weather automatic stations, the design and implementation of warning systems and the training and equipping of emergency response teams and firefighters. At the same time, support will be provided to the establishment of an integrated operations center, its requirements and basic operating procedures, which basic functions would include at least the following: (i) receive, monitor, and assess disaster information – a starting point for this will be GEOBASES; (ii) receive, assess, and track available resources; (iii) conduct preliminary damage assessments and maintain documentation on extent of damage; (iv) make policy decisions and proclaim local emergencies as needed; (v) provide direction and control for emergency response operations, set priorities and establish strategies; (vi) keep local jurisdictions informed;

(vii) develop and disseminate public information warnings and instructions; (viii) monitor, assess, and track response units and resource requests; and (ix) coordinate operations of all responding units.

8. Component 2: Efficient Water Supply Services and Increased Access to Sanitation (US\$215.6 million of which US\$141.5 million IBRD). This component supports investments that aim at increasing the efficiency of water supply services and increasing the coverage of sewage collection and treatment services in the SES. The lead entity for this component will be CESAN. This component will finance, *inter alia*, the following activities:

- a. *Operational Efficiency Strategic Plan for CESAN (US\$6.0 million)*. Support will be provided to CESAN in the development of an Operational Efficiency Strategic Plan, that may include water loss reduction, commercial efficiency and the long-term strategic planning and effectiveness of its water and sewerage services. The specific scope of this plan will be defined in the early stages of project implementation. CESAN will likely mobilize additional investment resources from the Federal Acceleration Growth Program for the implementation of the activities outlined in this Operational Efficiency and Strategic Plan.
- b. *Sewerage Investments (US\$209.6 million)*. These investments will ensure adequate wastewater collection and treatment in the selected urban areas of: (i) the municipalities of Vila Velha and Cariacica in the GVMR, and (ii) nine municipalities located in the interior of the State in the Caparaó Region and the Santa Maria da Vitória and Jucu river basins. The following tables provide details on the works to be financed and are based on information extracted from the engineering designs available for the nine municipalities in the Interior.²⁰ As for the GVMR municipalities, CESAN's engineering department has provided estimates from internal feasibility studies and the detailed engineering designs will be contracted under turn-key contracts. The cost of this component includes supervision contracts for the municipalities in the Caparaó Region and the Santa Maria da Vitória and Jucu river basins, which is estimated at US\$2.2 million. Supervision for the works in the GVMR is part of the contract with the project management firm to be financed under Component 4.

These investments will include the financing of goods, works and services related to the implementation of CESAN's household connection program²¹ to scale-up the rate of connections to the sewerage network in the areas where sewerage investments are being undertaken (particularly low-income households) and promote the health and environmental benefits of connecting to the network. An assessment of issues influencing decision-making around connection to the network will include

²⁰ Piping and equipment sizing, as well as hydraulic and organic capacities have been defined for all municipalities. For those municipalities which only count on preliminary engineering designs, the development of the detailed designs including the architectural, structural, mechanical, and electrical designs will be part of the works contracts.

²¹ The program will be included as part of the construction contracts and comprise of (i) the physical connection of households and their intra-domiciliary facilities to the sewerage network; (ii) a communication and marketing campaign; (iii) mobilization at the community level; and (iv) door-to-door campaigns on the importance of connecting to the sewerage network.

information on how to develop gender-sensitive communication strategies around connectivity.

Table A2.1 Detailed description of the sewerage investments.

Municipality	Beneficiary Population (urban)	Estimated increase in coverage of services (%)	Description	Estimated cost (\$ million)
Vila Velha	29,872	From 51.8 to 66	Expansion of existing Araças plant capacity from 400 to 650 L/s, installation of new networks (39.7 km) and construction of 2 raw sewage pumping stations. The current treatment plant uses the activated sludge process.	62.9
	41,915	From 11 to 100	Expansion of existing Ulisses Guimarães plant capacity from 30 to 150 L/s, installation of new networks (55.4 km) and construction of 4 raw sewage pumping stations. The current treatment plant uses the “integrated UASB process.” ⁽¹⁾	60.1
Cariacica	31,100	From 52 to 68	Expansion of the existing Bandeirantes sewerage networks with the installation of new networks (75.0 km) and the construction of 8 raw sewage pumping stations. The current treatment plant uses the activated sludge process (capacity of 250 L/s).	17.0
	5,173	From 1.4 to 100	Expansion of the existing Nova Rosa da Penha sewerage networks with the installation of new networks (13.1 km) and the construction of 2 raw sewage pumping stations. The current treatment plant uses oxidation lagoons (capacity of 48 L/s).	15.4
Ibatiba	13,792	From 0* to 100	Rehabilitation of existing plant and expansion of capacity from 7.5 to 32.5 L/s, installation of new networks (41.9 km) and construction of 6 raw sewage pumping stations. The current treatment plant uses the “integrated UASB process.” ⁽¹⁾	11.2
Irupi	4,461	From 13 to 100	Construction of new treatment plant** (capacity of 12 L/s), installation of new networks (11.2 km) and construction of 3 raw sewage pumping stations. The treatment plant will use the “integrated UASB process.” ⁽¹⁾	3.4
Dores do Rio Preto	2,197	From 0 to 100	Construction of new treatment plant (capacity of 6 L/s), installation of new networks (7.0 km) and construction of 2 raw sewage pumping stations. The treatment plant will use the “integrated UASB process.” ⁽¹⁾	2.4
Divino São Lourenço	2,041	From 0 to 100	Construction of new treatment plant (capacity of 5 L/s), installation of new networks (6.6 km) and construction of 3 raw sewage pumping stations. The treatment plant will use the “integrated UASB process.” ⁽¹⁾	3.0
Iúna	13,817	From 7* to 100	Rehabilitation and expansion of existing treatment plant from 20.5 to 36.0 L/s, installation of new networks (44.5 km) and construction of 3 raw sewage pumping stations. The treatment plant will use the “integrated UASB process.” ⁽¹⁾	9.6

Municipality	Beneficiary Population (urban)	Estimated increase in coverage of services (%)	Description	Estimated cost (\$ million)
Conceição do Castelo	4,859	From 8 to 100	Construction of new treatment plant (capacity of 11 L/s), installation of new networks (16.8 km) and construction of 4 raw sewage pumping stations. The treatment plant will use the “integrated UASB process.” ⁽¹⁾	5.5
Santa Maria de Jetibá	7,460	From 59 to 100	Rehabilitation of existing treatment plant (capacity of 27.3 L/s), installation of new networks (8.3 km), rehabilitation of 2 raw sewage pumping stations and construction of 3 new stations. The treatment plant will use the “integrated UASB process.” ⁽¹⁾ The current treatment plant uses the activated sludge process.	4.0
Marechal Floriano	5,461	From 0 to 100	Installation of new networks (17.9 km) and construction of 3 new raw sewage pumping stations. The construction of the corresponding treatment plant will not be financed by the Project and will use activated sludge process (capacity of 12.6 L/s).	6.0
Santa Leopoldina	2,776	From 40* to 100	Rehabilitation of existing treatment plant (capacity of 6 L/s), installation of new networks (14.6 km) and construction of 5 new raw sewage pumping stations. The current treatment plant uses the “integrated UASB process.” ⁽¹⁾	5.0

* The wastewater treatment plants in these cities are currently not in operation.

** These municipalities currently have collective septic tank systems.

⁽¹⁾ The “integrated UASB process” concentrates in a one treatment unit an Upflow Anaerobic Sludge Blanket Reactor (UASB), a submerged aerated biofilter and a settler.

9. Component 3: Watershed Management and Restoration of Forest Cover (US\$23.6 million of which US\$14.5 million IBRD). The quality of surface and coastal waters is strongly affected by conditions in upper watersheds. Untreated effluents are a significant source of contamination, as are some agricultural practices. Poorly sited and designed roads and inappropriate land uses are important sources of sediment.²² This component will focus on improving the quality of surface and coastal waters through coordinated interventions in selected watersheds. Addressing only one of the problems affecting downstream water users (poor roads, poor sanitation, and inappropriate land uses) is unlikely to result in improved water quality. The project, accordingly, includes activities to address each of the three. These interventions ultimately will result in a better quality of drinking water in the GVMR, as a large portion of the areas proposed for intervention are the source of water supply to the GVMR. This component will achieve this, inter alia, by supporting the following SES programs:

- a. *Reflorestar Program (US\$16.2 million).* SEAMA is the lead secretariat to implement this activity. The project will help induce land use change in selected watersheds by supporting, extending and strengthening the Borrower’s capacity in implementing a program of Payments for Environmental Services (PES), also known as *Reflorestar* in

²² For a review of the links between upstream land use and downstream water quality, see, *inter alia*, Bruijnzeel, L.A., 2004. “Hydrological functions of moist tropical forests: Not seeing the soil for the trees?” *Agriculture, Ecosystems and Environments*, 104, pp.185-228.

SES, aimed at encouraging conservation of existing forest cover, and restoring degraded ecosystems in the watersheds supplying the GVMR. Box A2-1 describes in more detail the *Reflorestar* Program. The PES in SES was originally developed with the support of the Biodiversity and Watershed Conservation and Restoration Project (*Florestas para Vida* - P094233), currently under implementation. In 2012, based in part on inputs and technical assistance provided under *Florestas para Vida*, the SES passed a new PES law and replaced its previous PES program, titled *ProdutorES de Água*, with a new PES program called *Reflorestar*.²³ *Reflorestar* includes, inter alia, (i) training and technical assistance to the rural producers (*Assistência Técnica de Extensão Rural* – ATER) in terms of selecting appropriate forest recovery and land-use modalities; (ii) financing short-term payment for environmental services schemes,²⁴ and (iii) carrying out an impact evaluation (initiated under *Florestas para Vida*) of *Reflorestar*'s impact on land use change in the target areas.²⁵

Box A2-1: PES in Espírito Santo

Espírito Santo's *Reflorestar* PES Program was established in 2012, building on the earlier *ProdutorES de Água* program. *ProdutorES de Água* was created under Law No.8995 of 1998, and was the first state-wide PES program in Brazil. It supported forest conservation in hydrologically important areas, paying participating landholders about R\$100-400/ha/year (based on a formula that considers the extent of forest cover and the slope) to preserve existing forests, using funding from *Fundágua*, which was also established in 2012, under Law No.8960. *Fundágua* receives a portion of oil royalties paid to the state and must devote 60 percent of its resources to PES; in 2010, for example, this amounted to potential financing for PES of R\$5 million. Implementation began in the Rio Benevente watershed in 2010, and was then extended to the São José and Guandu watersheds. By 2012, 1,910 ha were enrolled.

The relatively limited enrollment in *ProdutorES de Água* (for comparison, Costa Rica enrolled about 200,000 ha in its first three years) was due to three main factors: (1) a very small implementation team in IEMA, coupled with relatively complex implementation requirements; (2) a wait-and-see attitude among many landholders towards conservation, in light of the then-ongoing debate over the new forest law, which proposed to substantially modify conservation requirements; and (3) the relatively low level of payments offered (the amount being fixed in Law No.8995), which were insufficient to induce restoration of degraded areas.

Reflorestar was intended to build on and extend *ProdutorES de Água*. A revised PES law (No.8954) was approved in 2012, which allowed for substantially higher payment levels, thus making restoration attractive for landholders. A new approach was adopted, with a short-term payment for restoration coupled with a separate longer-term payment for conservation. Restoration payments range from R\$980/ha for natural regeneration to R\$3040/ha for direct planting. They are intended to cover the costs of undertaking restoration, and are paid over three years, with 50 percent of the amount paid in the first year, when the bulk of expenditures occur. Restoration payments are also offered for the establishment of certain productive practices that are expected to generate environmental benefits

²³ Espírito Santo was the first state to adopt an explicit PES law (Law 8995 of 22 September 2008); this law was recently revised (under Law 9864 of 26 July 2012) to allow for a broader application of the approach. The state has also established a Water Fund (*Fundágua*) to finance PES in the state.

²⁴ Payments made under the Payment for Environmental Services Scheme will be made through the already established State Water Fund (*Fundágua*). Bank disbursements will be made on a lump sum basis, using statement of expenditures that list the contracts signed as the required supporting documentation.

²⁵ The project will support an impact evaluation of *Reflorestar*'s impact on land use changes begun under the *Florestas para Vida* project. This impact evaluation will focus on three river sub-watersheds (Mangaraí, São Sebastião de Cima, and São Paulinho de Aracê) and on control areas of similar geographic and socio-economic characteristics.

relative to current land uses, including agroforestry (R\$1350/ha) and silvopastoral practices (R\$3200/ha). Conservation payments range from R\$76/ha/year for natural regeneration to R\$90/ha/year for standing forest. They are intended to cover the opportunity costs of maintaining land under conservation practices. They are paid over five years and are renewable. Productive practices such as agroforestry and silvopastoral practices are not eligible for long-term conservation payments.

A management plan is developed for every participant, which shows existing forest areas and areas to be restored. NGOs and private companies have been contracted to undertake activities in the field (development of management plans, provision of TA, monitoring of compliance), thus avoiding the problem of IEMA's limited field implementation capacity. These fieldwork contracts are relatively expensive, however, in part because of the small area covered in early contracts, which drives up the cost per hectare. Efforts will be needed to reduce the per hectare costs.

Participants are not obligated to bring their entire property under compliance with environmental laws, but receive lower payments if they do not; conversely, they receive higher payments if they exceed requirements. This approach avoids the all-or-nothing approach that has proven a major obstacle to participation in similar programs in other states and creates an on-going incentive to meet or exceed conservation requirements. With the revised Forest Law having been adopted over a year ago, uncertainty over its requirements is no longer expected to be an important factor in participation decisions.

With the project's support, the SES intends to expand its *Reflorestar* program to 21 municipalities and restore approximately 3,850 hectares of forest.²⁶ This will contribute to 12 percent of the goal set by the State-wide Program for 2014.²⁷ The lead entity for the reforestation program will be SEAMA/IEMA. The land uses supported by *Reflorestar* tend to increase infiltration, reduce runoff, and limit access to rivers by livestock, thus reducing erosion, and hence sediment loads in the rivers from which CESAN obtains water for the GVMR, as well as serve several hydroelectric power plants and the port of Vitória. Priority areas identified for the implementation of *Reflorestar* include the Santa Maria da Vitória and Jucu River Basins, where small scale farming practices have fragmented forest cover and reforestation is crucial to reduce sedimentation in the rivers due to erosion, and the micro-region of Caparaó because of its importance in supplying water to surrounding regions.

- b. *Mangaraí River Pilot project (US\$7.4 million)*. CESAN has identified the Mangaraí River sub-watershed as being a major source of silt loads affecting the water quality at its Santa Maria and Carapina treatment plants. The *Mangaraí River Pilot project* seeks to reduce silt loads originating in this sub-watershed through a holistic approach that combines reforestation and improved land management with a range of other interventions, such as improvement to roads and sanitation in the watershed. The Project will first finance consulting services to elaborate a general diagnostic of the

²⁶ Every PES program requires an organization to undertake the required fieldwork – negotiating with and then contracting eligible farmers, providing TA, monitoring compliance, making payments, etc. Given that Espírito Santo had already established such an organization for its *ProdutorES de Água* program (now replaced by the *Reflorestar* Program), it was decided that it would be more efficient to use this same organization to implement the *Florestas para Vida* PES program rather than set up an entirely separate organization. *Reflorestar* will thus implement the PES payments during the remaining time of the *Florestas para Vida* Project, and will continue to do so under the proposed project.

²⁷ The *Reflorestar* Program set to increase the State's forest cover by 31,500 hectares (from 2012 to 2014) and by 200,000 hectares by 2025.

situation in the sub-watershed with a focus on erosion reduction and transport of materials to rivers and streams.

It will also support improved land use (through the *Reflorestar* program) and finance specific investments within the Mangaraí sub-watershed, such as improvements to roads and sanitation, by financing consulting services to (i) identify critical roads and priority works in terms of sediment production; (ii) develop the technical designs for those works as well as ensure the corresponding supervision; and (iii) develop rehabilitation and maintenance norms for rural roads with the objective of reducing silt load production and train the entities in charge of rehabilitating and maintaining these roads in the Mangaraí sub-watershed, as well as across the SES; (iv) identify sustainable institutional arrangements for operation and maintenance of rural roads; (v) identify appropriate sanitation solutions (including water supply, sewerage and solid waste) or equipment of collective use such as public areas and sport facilities, for the communities in the sub-basin, through consultations.

According to IBGE information, 15.9 and 10.2 percent of households are headed by women in the municipalities of Cariacica and Santa Leopoldina, respectively. However, estimates from local INCAPER agronomists estimate that this figure drops to about 8 percent in the pilot area of Mangaraí. The PES will be made to the head of the property which in most cases is expected to be the male. There is thus a need to empower women socially and economically, to avoid a widening of the power gap within households.

Based on INCAPER's experience in working with women in rural areas of the State through its *Economistas Domésticas* (professional social workers), and in order to ensure gender-sensitive implementation of the pilot project activities, a professional social worker will be hired for the Mangaraí River Pilot area and will be responsible for working with women and women's groups to implement training aimed to empower women economically (such as overseeing programs/activities designed to add value to products, business related skills, basic market analysis skills), paired with training on citizenship and rights, aimed at empowering women socially. This professional will assist women to become empowered and participate more fully in decision-making in the target region, become agents and protagonists of the Project and increase their economic status as well. Previous experiences with similar interventions have shown improvements in women's bargaining power within the household due to changes in families' income structure.

Focus groups will also be held with women in the pilot region to develop a primary diagnosis and better understand gender dynamics, especially with regards to potentially different needs and interests of women and men. This will specifically involve two local organized women's groups. In addition, the Project will build on INCAPER's participatory approach to produce local diagnostics. In the upcoming diagnosis process for the target municipalities of Santa Leopoldina and Cariacica,²⁸ some specific exercises and questions will be included to have a stronger focus on

²⁸ The Mangaraí River sub-basin area is enclosed in the two municipalities of Santa Leopoldina and Cariacica.

gender. This will help to plan concrete initiatives best suited to the specific needs of men and women in these municipalities.

Finally, the Project will support impact evaluations to determine the effectiveness of selected interventions. The lead agency for the Mangaraí Pilot will be INCAPER, with input from CESAN, SEAMA and IDAF.

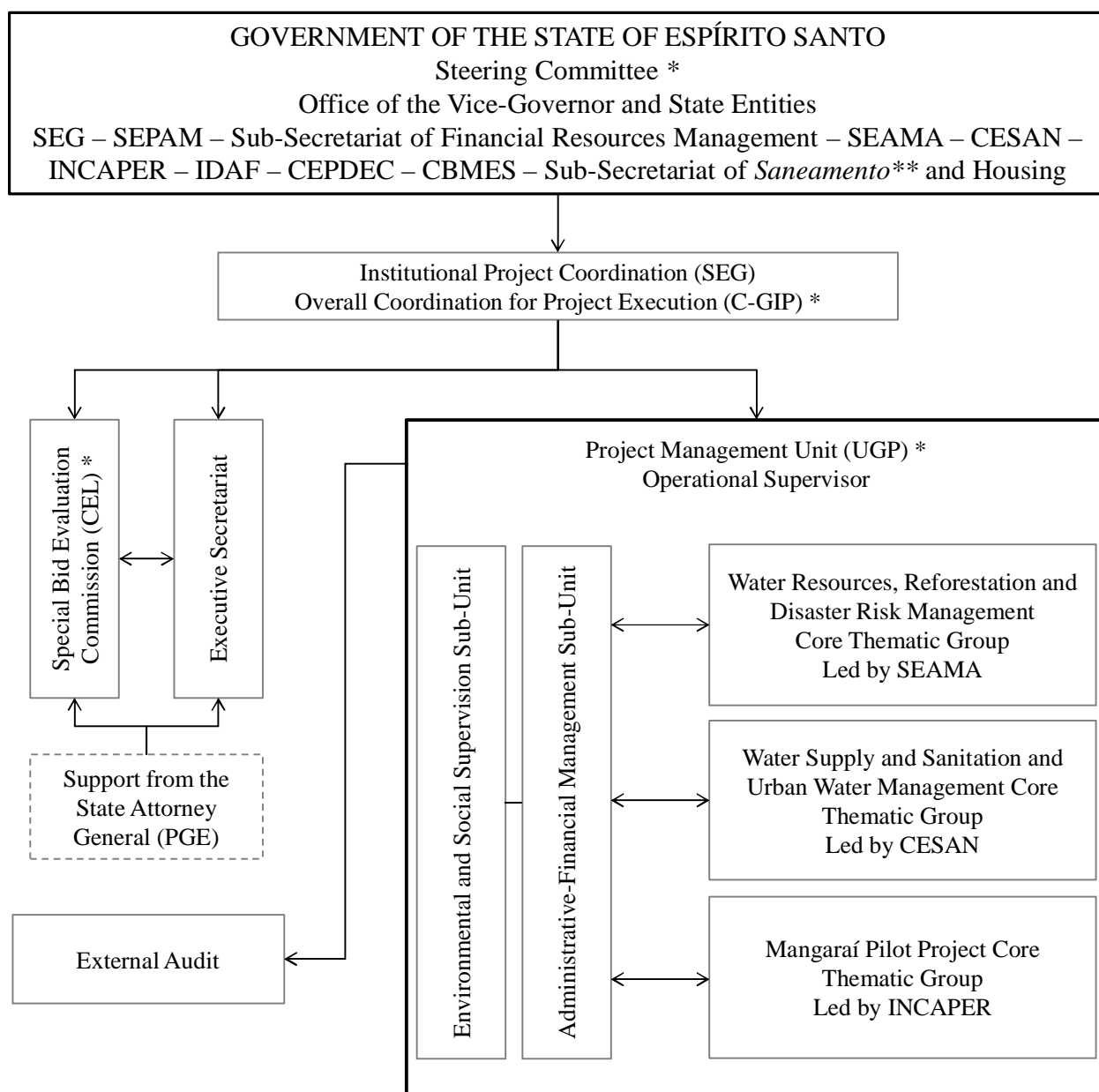
10. Component 4: Project Management, Supervision and Institutional Strengthening (US\$23.8 million of which US\$23.8 million IBRD). In line with successful experience from previous operations in the State, this component finances institutional support and strengthening the State's capacity in Project management and implementation, including the provision of training and technical assistance for the carrying out of activities associated with Project execution, monitoring and evaluation of the Project and the provision of technical, administrative and financial management support, as well as the supervision of sewerage works to be implemented in the GVMR. This component will also strengthen the Capacity of the Espírito Santo Regulatory Agency for Water, Sanitation and Road Infrastructure (Agência Reguladora de Saneamento Básico e Infraestrutura Viária do Espírito Santo – ARSI) by developing an economic and financial regulatory model for water supply and sewerage services that can guarantee its sustainability and social equity (i.e., affordable tariffs for low income population).

Annex 3: Implementation Arrangements

BRAZIL: Espírito Santo Integrated Sustainable Water Management Project

Project Institutional and Implementation Arrangements

1. Project implementation arrangements will build on the lessons learned from past operations in water and sanitation in the SES which proved to be robust and effective at meeting objectives in a timely and efficient manner. These arrangements will rely on: (i) the oversight of a Project Steering Committee (*Comitê Diretivo do Projeto*), (ii) the State Secretariat of Government (SEG), which has been designated as the Project Implementing Entity, responsible for, responsible for institutional project coordination, (iii) an Overall Coordination for Project Execution (C-GIP), will function under SEG and be responsible for the overall project implementation, (iv) an independent Project Management Unit (*Unidade de Gerenciamento do Projeto*, UGP), comprising a project operational supervisor with support from three Core Thematic Groups (CTG), an Administrative-Financial Management sub-unit and an Environmental and Social Supervision sub-unit. Each CTG will coordinate activities on behalf of each institution involved which will help facilitate and operationalize inter-sectoral planning.
2. The Project Steering Committee will have consultative and decision making powers, as well as be responsible for the general supervision of the Project's activities and for establishing strategies to overcome obstacles encountered during project implementation and catalyze the development of new strategies to move forward. The Project Steering Committee will be chaired by a high-level government official and will comprise high-level representatives from key State entities that are participating in the Project. The Project Steering Committee has already been created through Decree No. 3450-R issued on December 4, 2013.
3. An Executive Secretariat, chaired by the Borrower's *Subsecretaria de Captação de Recursos*, to assist the Project Steering Committee, the Institutional Coordination and the C-GIP in the carrying out of its respective functions under the Project and be responsible for accompanying Project implementation, and liaising with the Bank on the Borrower's obligations under the Project, including procurement matters and execution of the Project's procurement plan (including the use of the procurement system).
4. The State Secretariat of Government (SEG), as the project's institutional coordinator, is responsible for programming the budget in accordance to the plans approved by the Project's Steering Committee and requested by C-GIP, and will be responsible for the budget decentralization and transfer of resources for project execution as requested by C-GIP.
5. C-GIP will function under the Institutional Coordination (SEG) and will be responsible for the overall project execution, including planning and oversight of UGP activities on project management and implementation.
6. Through Resolution [insert resolution number and date] the Project Steering Committee has created a special bid evaluation commission (*Comissão Especial de Licitação*, CEL), consisting of representatives from CESAN, SEAMA, SECONT, SEDURB, SEPAM, *Subsecretaria de Estado de Saneamento e Habitação* and the Executive Secretariat, provided with sufficient assistance as needed, responsible for ensuring the carrying out of procurement under the Project as well as legal support (i.e., validation of procurement processes) from the State Attorney General (PGE).



* Established officially by State Decree No. 3450-R (issued on December 4, 2013).

** *Saneamento* in Brazil includes water supply, sanitation and solid waste management.

Project administration mechanisms

7. The UGP will be responsible for the technical (Core Thematic Groups, CTGs), administrative, financial, environmental and social management and execution of the Project's activities, under the helm of the C-GIP, and will be responsible for the preparation of bi-annual project progress reports, which are to be submitted to the Bank 45 days after the end of each

semester of the calendar year. The Administrative-Financial Management sub-unit will cater to the three CTGs and establish the communication channels with the State entities' financial management units and with the State Secretariat of Finance (SEFAZ), responsible for the internalization and provision of World Bank and State Government counterpart funds. An Environmental and Social Supervision sub-unit will also be in place at the UGP to accompany the implementation of the Environmental Framework, the Environmental Management Plan as well as the Resettlement Plan and Framework and supervise corresponding activities and coordinate its activities with all three CTGs. The following table describes the responsibilities of each of the State entities.

8. An external consulting firm will provide support to the UGP in the implementation of the project. This firm will provide specific technical expertise and support to the following areas: (i) administrative and financial management support, (ii) implementation of the Resettlement Plan and Framework as well as the Environmental Management Plan and Framework, including preparation of additional environmental studies and plans as required, (iii) reviewing and updating designs and terms of reference for various project activities and assist in the preparation of the documents related to the bidding and consulting selection processes, and (iv) providing specialized individual consultants (with specific technical expertise, such as disaster risk management), as required to support and provide added value to project implementation.

State entity	Responsibilities
SEAMA	<ul style="list-style-type: none"> Steering Committee: participation of a high-level representative UGP – Water Resources, Reforestation and Disaster Risk Management CTG: entity in charge of leading the execution of the activities related to Water Resources, Reforestation and Disaster Risk Management (Components 1 and 3)
CESAN	<ul style="list-style-type: none"> Steering Committee: participation of a high-level representative UGP – Water Supply and Sanitation and Urban Water Management CTG: entity in charge of executing the activities related to executing the activities related to Water Supply and Sanitation (Component 2) as well as Urban Water Management and other institutional aspects related to the GVMR (Component 1) UGP –Mangaraí Pilot Project CTG: will support the execution of the Mangaraí Pilot Project (Component 3)
INCAPER	<ul style="list-style-type: none"> Steering Committee: participation of a high-level representative UGP – Mangaraí Pilot Project CTG: entity in charge of executing the activities related to Mangaraí Pilot Project (Component 3)

Financial Management, Disbursements and Procurement

Financial Management

9. A Financial Management (FM) assessment was carried out in accordance with Bank guidelines. The FM risk associated with the Project has been assessed as “Moderate” mainly due to the following factors: the involvement of a high number of agencies and secretariats in the project's implementation that can make it difficult to exercise the proper oversight and control of the project execution, the dependency on SEFAZ to transfer the resources and the non-integration of the Financial and Physical Monitoring System (SAFF) with the Integrated Administrative and Financial State and Municipal System (now SIAFEM and in the future SIGEFES). The assessment evaluated the project's FM arrangements, for the time being, as

“Moderately Satisfactory”, due to the need to: adapt the budget, charts of accounts, systems (SAFF, SAP and SIGEFES) and controls to the project; hire/designate the financial management team; prepare the Operational Manual; and conclude the development and implementation of SIGEFES (the new Administrative and Financial System of Espírito Santo).

10. Mitigation measures include: (i) preparation of a user friendly and detailed operational manual by negotiations, (ii) preparation of the audit terms of reference, (iii) SIGEFES - the new budgeting and accounting state system - and SAFF- the monitoring system – should be fully operational and capable of running the agreed Interim Unaudited Financial Reports (IFRs) and satisfy Bank requirements and (iv) close monitoring and follow up by the UGP staff, assuring proper field supervision missions to provide training on the financial management and disbursements procedures throughout project implementation. FM supervision missions are expected, in the beginning, to be undertaken on a bi-annual basis, subject to an adjustment based on the financial management risk and adequacy of the financial management arrangements.

11. SIGEFES - the State budgeting and accounting system - and SAFF²⁹ - the monitoring system – will be, until negotiations, fully operational and capable of running the agreed Interim Unaudited Financial Reports (IFRs) and satisfy Bank requirements. The UGP maintains and manages the SAFF system that has been used to manage other donor-financed projects, and as such, the system is considered acceptable for this project as well. Annual budget (POA) amounts approved by the Steering Committee will be updated in the system which will be accessible to the UGP for budget execution and project monitoring.

12. Disbursements for Payment for Environmental Services (PES) will be made to Fundágua (a fund that is managed by SEAMA). The disbursements will reimburse Fundágua for payments already made from a segregated operational account to rural producers under the PES contracts. A custom report, as defined in the disbursement letter, will establish the documentation required to disburse funds for PES payments. In addition, the annual audit will review that the payments made from Fundágua's segregated operational account were (i) to rural producers/land users under signed PES contracts, (ii) that the payments covered activities carried out within the eligible period, and (iii) that the activities carried out were verified to be consistent with the PES contract.

13. Interim Unaudited Financial Reports (IFRs) will be prepared on a cash-basis and will show the budgeted and expenditure figures by quarter, accumulated for the year and accumulated for the project. A specific ledger will be created in the system to record all loan transactions, and will be aligned with the structures of the loan cost and disbursement tables to record transactions by category and component/subcomponent. They will be sent not later than 45 days after each calendar year quarter. All counterpart contribution supporting the loan's activities will be reflected in the IFRs.

14. An audit of the project's financial statements will be conducted by an independent audit firm acceptable to the Bank, carried out in accordance with terms of reference acceptable to the

²⁹ Under previous projects SAFF, a full service financial management system created by CESAN that enables all annual budget planning, review and approval, execution, and monitoring to occur in a secure, efficient, and transparent environment was developed and implemented. Under this project an updated version, will be adopted which will allow the system to be internet based and permit the online consultation of the information.

Bank and the Bank's audit policy under a multiyear contract. The audit's terms of reference will be subject to review that will require the respective "No Objection" by the Bank. The audit will be due no later than six months after the end of the fiscal year. The audit report will contain a single opinion on the project financial statements and the designated account and a management letter (report on internal controls). The audit report will be subject to the World Bank policy on Access to Information.

Disbursements

15. Designated Account. Disbursements will be made primarily via the Advance disbursement method. SEFAZ will open a segregated Designated Account (DA), in US Dollars, in the Banco do Brasil [to be confirmed], with a Fixed Ceiling of US\$20 million. Supporting documentation required for documenting eligible expenditures paid from the DA are Statements of Expenditures and Summary Sheets with Records. Payments made under the Payment for Environmental Services Scheme will be made through the already established State Water Fund (*Fundágua*). Bank disbursements to the Fundágua will be made on a lump sum basis, using statement of expenditures that list the contracts signed as the required supporting documentation. The frequency for reporting eligible expenditures paid from the DA is quarterly. The Reimbursement disbursement method will also be available and reimbursements would also be documented by Statements of Expenditures and Summary Sheets with Records. The Minimum Application Size for Reimbursements will be US\$2 million equivalent.

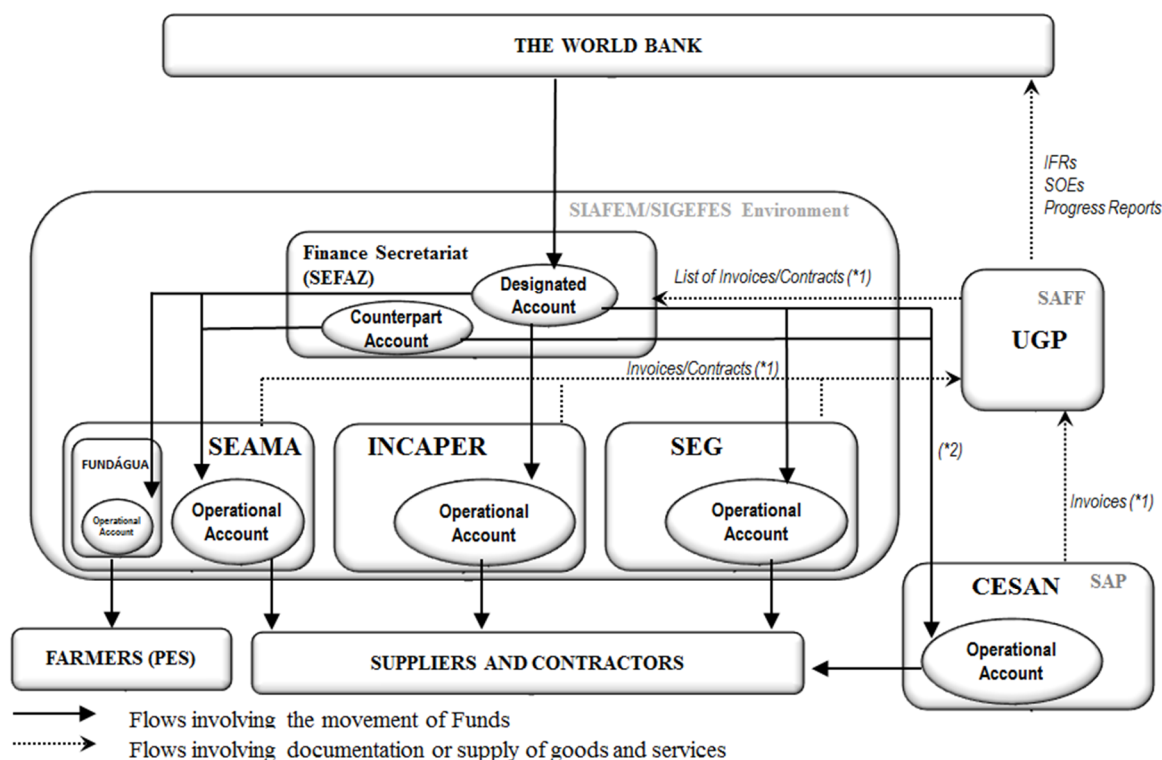
16. The Project will have a Disbursement Deadline Date (final date on which the Bank will accept applications for withdrawal from the Borrower or documentation on the use of Loan proceeds already advanced by the Bank) four months after the Project Closing Date. This "Grace Period" is granted in order to permit the orderly project completion and closure of the Loan account via the submission of applications and supporting documentation for expenditures incurred on or before the Closing Date.

17. Expenditures incurred between the Closing Date and the Disbursement Deadline Date are not eligible for disbursement, except as otherwise agreed with the Bank. The information required for the compilation of Statements of Expenditure and Summary Sheets will be maintained by the FM sub-unit in the UGP. The transfers from SEFAZ to the partners will be made upon a list of invoices sent by the UGP attesting the proper delivery of the products and/or of the services. The counterpart values will be added by SEFAZ on a *pari-passu* model. Transfers to CESAN will be done by Capital Increase (from SEDURB) phased upon the payment of invoices.

18. Other accounts: Each partner will open an operational account which will receive the transfers from SEFAZ and pay the suppliers, contractors and the PES. There will be 5 operational accounts (to account the cash inflows from SEFAZ and the cash outflows to the suppliers and PES): two in SEAMA (one of which in Fundágua), one in INCAPER, one in SEG and one in CESAN. Since transfers from SEFAZ will be made against the list of invoices and PES submitted, the operational accounts will serve mainly as a registering and controlling process and they will always be kept "zeroed".

19. Retroactive Financing: Payments made prior to the Signing Date of the Loan Agreement but on or after October 1, 2013 for Eligible Expenditures, up to an aggregate amount not to

exceed US\$20,000,000 equivalent will be eligible in order to finance some of the activities that are at an advanced stage of preparation.



Notes:

(*1) All Invoices and PES Contracts (and the Environmental technical reports stating the eligibility of the PES) will be sent to the UGP which will then prepare and send a list to SEFAZ for processing the transfers/payments.

(*2) Transfers to CESAN will be done by Capital Increase (through SEDURB) phased upon the payment of the invoices.

20. The loan withdrawal schedule is as follows:

Category	Amount of the Loan Allocated (expressed in USD)	% of Expenditures to be financed (inclusive of taxes)
1. Goods, works, consulting services, non-consulting services and training under Component 1	44,600,000	75%
2. Works under Component 2	133,400,000	65%
3. Goods, consulting services, non-consulting series and training under Component 2	8,100,000	80%
4. Goods, works, non-consulting and consulting services and training under Component 3	8,200,000	75%
5. Payment for Environmental Services under Component 3	6,337,500	50%
6. Goods, consulting services, non-consulting services and training under Component 4	23,800,000	100%

Category	Amount of the Loan Allocated (expressed in USD)	% of Expenditures to be financed (inclusive of taxes)
7. Front-end Fee	562,500	Amount payable pursuant to Section 2.03 of the Loan Agreement in accordance with Section 2.07 (b) of the General Conditions
8. Interest Rate Cap or Interest Rate Collar premium		Amount due pursuant to Section 2.07(c) of the Loan Agreement
Total	225,000,000	

Procurement

21. Procurement for the proposed Project will be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated January 2011; and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated January 2011 and the provisions stipulated in the Legal Agreement. A Procurement Plan acceptable to the Bank was prepared and will be updated at least annually, or as deemed necessary. Template bidding documents for International Competitive Bidding, National Competitive Bidding and Request for Proposal documents will be made available online at the Implementing agencies' website.

22. As the procurement arrangements established for the previous Bank's financed Espírito Santo Water and Coastal Pollution Management Project (P087711) have worked well, it is proposed that the same type of organizational procurement structure be adopted in this project. In this sense the Overall Coordination for Project Execution (C-GIP), the Special Bidding Commission (*Comissão Especial de Licitações*, CEL), the UGP and the Implementing Agencies (CESAN, INCAPER, SEAMA) will be the entities, as in the previous operation, with procurement responsibilities and with involvement in the procurement flow. The role of each of these entities will be as follows:

- a. The Executive Secretariat will be the Bank's focal point and will be responsible for submitting to the Bank the terms of reference, procurement documents and procurement plan for no objection, for setting up and organizing the CEL's meetings, and for implementing the procurement plan with the assistance of the Project Management Unit's procurement specialists.
- b. A Special Bidding Commission (CEL) will be set up specifically for this project and will comprise members from SEDURB, SEPAM, CESAN, SEAMA and SECONT (*Secretaria de Controle e Transparência*), *Subsecretaria de Estado de Saneamento e Habitação* and the Executive Secretariat. The CEL will be responsible for approving the shortlists, bidding documents and RFPs, reviewing the advertisements for shortlisting and bidding opportunities, clearing the evaluation reports, opening the bids and preparing the bid opening records, conducting contract's homologation, responding to bidder's queries and complains and monitoring the procurement plan. The CEL members must have the flexibility and availability to meet as often as needed to ensure the smooth execution of the procurement processes.

- c. *Implementing agencies*, CESAN, SEAMA, INCAPER, will be responsible for the (i) preparation of terms of reference, budgets and technical specifications, (ii) advertising the shortlisting and bidding opportunities (iii) elaboration of shortlists, including clear evaluation shortlisting criteria, (iv) providing inputs for the issuance of the RFP and Bidding Documents, (v) evaluation of technical and financial proposals, (vi) preparation and submission of evaluation reports, (vi) assistance to the bidding commission on clarification requested from bidders during bidding preparation period, and (vii) conducting the e-reverse auction processes.
- d. *The C-GIP and the UGP* will need to ensure that the implementing agencies and the Executive Secretariat both comply with the procurement processes' milestones. It will provide support to the Implementing Agencies in all the activities described above. In addition, the C-GIP with support from the UGP will help with the supervision of contractors, firms, consultants and suppliers. The UGP will be supported by an external management consulting firm staffed, among other specialists, with at least one full-time procurement specialist familiarized with the Bank's procurement processes.

Capacity assessment of the entities to conduct the procurement processes.

23. The overall Project risk for procurement is "Moderate" due to the (i) need to hire on time an external consulting firm to help the implementing agencies in the preparation of procurement documents and processes, and (ii) concerns about the capacity of some agencies to prepare timely and good quality terms of reference and reliable budgets.

24. The procurement capacity assessment conducted on February 2013 by Etel Bereslawski draws the following findings:

- a. The Executive Secretariat and the CEL have both acquired sufficient experience on Bank's procurement procedures during the implementation of the previous project (Espírito Santo Water and Coastal Pollution Management Project) and also with the execution of the current Bank's GEF grant "Espírito Santo Biodiversity and Watershed Conservation and Restoration Project". Both entities have produced good quality of procurement documents, therefore it is envisaged that there would not be major constraints with the interpretation of Banks rules and bidding procedures, so no delays on the procurement processes are expected.
- b. SEAMA is familiarized with Bank's consulting procedures and it counts with a permanent team that will provide support on the bidding process. Given that INCAPER does not have any exposure to Bank's procurement process, the UGP should support INCAPER to ensure that the procurement activities and contracts are being implemented timely, with the adequate quality and according to the Bank's rules.
- c. The PGE will appoint staff with previous experience on Bank's procedures to conform to the State's requirement to have the PGE reviewing and clearing all the procurement processes carried out by the State. It is expected that the PGE will spend on average 5 working days in each procurement processes' review. The PGE is very familiar with the Bank's procurement procedures, and therefore no delays are expected.
- d. The UGP's staff will be supported by an external consulting management firm for the entire life of the project. The terms of reference for selecting this firm have already been prepared and the RFP is under preparation. The consulting firm should be hired within two

months of loan effectiveness. The Bank's selection procedures will be adopted for the selection of this firm and this process will be subject to Bank's prior review.

- e. Several terms of reference and consulting budgets are in an advance status of preparation and dedicated staff of the Implementing Agencies, PGE, CEL and the Executive Secretariat have benefited from a procurement training carried out during project preparation. In addition all these entities will continue benefiting from Bank support and training during project execution.
- f. More than 40 contractors are registered under CESAN's contractors' registration data base. It is therefore envisaged that a sufficient number of firms will participate in the NCB works bidding processes. Works will be grouped to increase the size and attractiveness of the contract as to draw the interest of a sufficient number of contractors.

Procurement thresholds

25. *Procurement of Works*: will initially comprise the construction and rehabilitation of wastewater collection and treatment plants in 9 municipalities in the interior of the State, a turnkey contract for the expansion of the wastewater collection network of the GVMR, rural roads construction works in the Mangaraí river Basin, construction of a water analysis laboratory and construction of the Emergency Operation Center. All work contracts above US\$25,000,000 will be procured through International Competitive Bidding (ICB) procedures and Standard Bidding Documents (SBD) will be adopted. Works above US\$200,000 and below US\$25,000,000 will be procured through National Competitive Bidding (NCB) procedures with Bidding Documents acceptable to the Bank. Shopping procedures can be adopted for contracts below US\$200,000.

26. *Procurement of Goods* will consist of the acquisition of small wastewater treatment plants, pluviometric and fluviometric monitoring stations, fertilizer, seedlings, hydrogel and rural metal fences. Goods estimated to cost more than US\$3,000,000 will be procured through ICB procedures and SBD will be used in the ICB bidding processes. Goods estimated to cost less than US\$3,000,000 equivalent per contract may be procured under contracts awarded on the basis of NCB procedures and with bidding document acceptable to the Bank. In particular, contracts estimated to cost less than US\$3,000,000 may be procured with e-procurement known as *pregão eletrônico* under Law 10,520 provided that this e-procurement procedure is previously approved by the Bank. Goods estimated to cost less than US\$100,000 equivalent per contract may be procured on the basis of shopping procedures.

27. *Procurement of Non-Consulting Services*: will involve a bathymetry survey, collection of ocean dynamic data (currents, waves, tides), technical assistance training to the rural producers (*Assistência Técnica de Extensão Rural, ATER*), etc. Non-consulting services estimated to cost more than US\$5,000,000 will be procured through ICB procedures and SBD will be used in the ICB bidding processes. Those services estimated to cost less than US\$5,000,000 equivalent per contract may be procured under contracts awarded on the basis of NCB procedures and bidding document acceptable to the Bank. In particular, contracts estimated to cost less than US\$5,000,000 per contract may be procured with e-procurement known as *pregão eletrônico* under Law 10,520/02 provided this e-procurement procedure is previously approved by the Bank. Services estimated to cost less than US\$100,000 equivalent per contract may be procured on the basis of shopping procedures.

28. *Selection of Consulting Services*, will include the selection of a consulting management firm for strengthening the UGP for the duration of the project, consulting services for the development of management plans for the São Mateus, Itaúnas and Itapemirim river basins, the development of a State Water Resources Management Plan, project design of the water quality laboratory facilities, development of a Water Resources Quality Monitoring Network and risk management plans. Selection of consultants will follow Quality and Cost Based Selection (QCBS) in general or Quality Based Selection (QBS) for complex or highly specialized services. Depending on the complexity and standardization, the consulting services costing less than US\$300,000, may also be procured following Least Cost Selection (LCS), Fixed Budget-based Selection (FBS), and Consultants' Qualification-based Selection (CQS) procedures. In exceptional cases, Single Source Selection (SSS) may be appropriate for consulting firms and/or individual consultants, if properly justified. Short lists of consultants for services estimated to cost less than US\$500,000 equivalent per contract may be composed entirely of national consultants. Individual consultants will be selected in accordance to the procedures described in Section 5 of the Guidelines. The need for special arrangements regarding engaging universities, government research institutions, public training institutions, NGOs or other types of organizations was not identified during project preparation.

Bank Reviews

29. Prior review thresholds for the Project are US\$3,000,000 for goods and non-consulting services, US\$25,000,000 for works, US\$300,000 for consulting services and US\$50,000 for individual consultants. All ICBs and single-source of consultants, as well as direct contracting for goods, non-consulting and works, and the terms of reference for all consultancies shall be prior reviewed by the Bank regardless of the amount involved. The Bank intends to prior review all procurement and consulting processes during the first year of the Project. The following years the Bank will prior review the first two NCB processes for goods, works or non-consulting services per year. The ratio of Bank reviews shall be no less than one in 20 contracts. In addition to the prior review supervision to be carried out from Bank offices, at least one annual procurement post-review mission will be carried out during Project implementation.

30. The Procurement Plan should indicate whether other contracts should be subject to prior review. In all cases of Single Source Selection (contracts with firms or with individual consultants), the Bank should give the "no objection" to the proposed assignment.

Environmental and Social (including safeguards)

31. An Environmental and Social Supervision team will be created within the project management unit to be responsible for supervising and monitoring the implementation of the environmental and social management plan in all of the project activities being undertaken, as well as adherence to the project's environmental management and resettlement frameworks developed during preparation. This will also include the gender actions that have been agreed on during appraisal, which are mainly focused around the Mangaraí pilot project.

32. CESAN, who will be responsible for the implementation of most of the sewerage works, has solid experience on the implementation of projects that adhere to Bank safeguard requirements. Previous Bank operations have helped strengthen CESAN's environmental management, and the company has adopted the Environmental Construction Manual (developed for previous Bank operations) as a standard operating procedure in all of its construction

contracts. CESAN has also partnered with the State's Environmental and Agricultural Institutes (IEMA and INCAPER) to research and develop adequate uses for the sludge generated from its wastewater treatment plants in agriculture, and is already implementing some pilot projects. CESAN also has significant experience with land acquisition and resettlement, as the company's investments, particularly in small towns, often require acquisition of small parcels of land for the construction of pumping stations and wastewater treatment plants.

33. As part of the gender actions taken forward through this project, a workshop will be held with all relevant stakeholders at the beginning of implementation to ensure gender issues will be mainstreamed throughout the design and implementation of the activities of the project.

Monitoring & Evaluation

34. The C-GIP with support from the UGP will monitor and evaluate the project based on the results framework detailed in Annex 1. This framework was developed in close coordination with our counterparts. In addition, as it was done under the previous operation, CESAN will produce a report containing key performance indicators for the company, related to operational, financial and quality of service provision. The UGP will submit the monitoring indicators twice a year. The primary sources of data will be the implementing agencies (CESAN, INCAPER, SEAMA) and indicators will be included in the Operational Manual. Additional qualitative data will be collected before and after implementation of the Mangaraí pilot to assess questions related to women's agency in the target region.

35. The Project will support an impact evaluation of *Reflorestar*'s impact on land use change. This impact evaluation will focus on three river sub-watersheds (Mangaraí, São Sebastião de Cima, and São Paulinho de Aracê) and on control areas of similar geographic and socio-economic characteristics. The evaluation will include a perspective on gender dynamics and issues in the target area.

Role of Partners (if applicable)

No other international agencies are financing the project.

Annex 4: Operational Risk Assessment Framework (ORAF)
BRAZIL: Espírito Santo Integrated Sustainable Water Management Project
Stage: Negotiations

1. Project Stakeholder Risks	Rating	Moderate		
<p>Description: <i>Stakeholder support:</i> Key stakeholders such as local farmers/producers might not support efforts to improve surface water quality in selected watersheds by adopting the Payment for Environmental Services model.</p> <p>Potential implementation delays on implementation of Component 3 could occur, associated with required behavioral changes related to land use as well as bringing legislative provisions and administrative structure for effective PES implementation</p> <p>CESAN’s customers are reluctant to connect to the sewerage network.</p>	Risk Management: Project efforts will build on local knowledge of state organizations and NGOs with extensive on-the-ground experience in the selected areas, and will be developed in a participatory way with substantial consultations with farmers and community representatives.			
	Resp: SEAMA	Stage: Preparation and Implementation	Due Date: 01/31/2021	Status: On going
	Risk Management: The implementation of the GEF-Financed Biodiversity and Watershed Conservation and Restoration Project (P092433) has already set the stage and put in place the administrative structure for the <i>Reflorestar</i> program, and has carried out numerous communication campaigns about the program to rural producers, which will continue throughout the implementation of <i>Reflorestar</i> . SEAMA and the Bank team will closely monitor in the initial implementation of these activities to ensure that any issues that could potentially cause delays on the implementation of this component are addressed during the early stages of implementation.			
	Resp: SEAMA	Stage: Preparation and Implementation	Due Date: 01/31/2021	Status: On going
	Risk Management: CESAN has a specific division within the company dedicated to improving communication related to connection to the sewerage system with households and accelerating connections to the sewerage networks being delivered and under construction. This division will be involved in project design and implementation to ensure adequate customer engagement. In addition, connecting households to the sewerage networks being built will be included in the works contracts.			
	Resp: CESAN	Stage: Preparation and Implementation	Due Date: 01/31/2021	Status: On going
2. Implementing Agency Risks (including fiduciary)				
2.1 Capacity	Rating:	Moderate		
<p>Description:</p> <p>The SES has a solid track record in Bank-financed projects and has adequate processes in place. The main risk associated with the State’s capacity for implementation center on the concerns about the capacity of some agencies to prepare timely and good quality terms of reference and reliable budgets.</p>	Risk Management: Bank staff and consultants have been providing technical assistance during project preparation in the preparation of terms of reference for most of the water resources management studies as well as in reviewing the proposed budget estimates. This assistance will continue through project implementation. In addition, all the implementing agencies and the UGP will be supported by an external consulting management firm throughout project implementation that will also provide them with the needed technical assistance for the preparation of terms of reference, technical specifications and reliable budget estimates.			
	Resp: Steering Committee & UGP	Stage: Preparation and Implementation	Due Date: 01/31/2021	Status: In progress
2.2 Governance	Rating:	Moderate		
<p>Description:</p> <p>Given the number of agencies and secretariats involved in the project’s implementation, it could be difficult to exercise proper oversight of project execution.</p>	Risk Management: The State already enjoys a high degree of inter-sectorial coordination in part fostered by similar implementation management approaches adopted in other projects. Project management will be guided by a Steering Committee with representatives from each of the key sector secretariats and will have a consultative nature and decision-making abilities.			

Challenges related to metropolitan governance and coordination between State and Municipal levels may delay and affect activities related to providing coordinated institutional solutions for integrated urban water management and disaster risk management.	Roles and responsibilities of each of the agencies/secretariats involved in the project will be clearly defined and recorded in the project's operational manual.			
	Resp: Steering Committee	Stage: Preparation and Implementation	Due Date: 09/30/2015	Status: Not yet due
	Risk Management: The State plans to undertake a participatory process with the municipalities during project implementation, and through SEPAM, will coordinate activities and interventions with the GVMR Metropolitan Council (COMDEVIT) which has representation from the municipal level. Priority will be given to flood management, where there is expressed interest by the municipalities in the GVMR to work together.			
	Resp: Steering Committee, COMDEVIT, UGP	Stage: Implementation	Due Date: 01/31/2021	Status: In progress
3. Project Risks				
3.1. Design				
<p>Description: The lack of up-front buy-in from households in connecting to the sewerage network increases the chances of a low rate of connection and of achieving key project results.</p> <p>The project will work with the SES in establishing adequate governance frameworks and coordination mechanisms for the management of metropolitan issues (such as drainage), and water resources management. Overall atmosphere is of a collaborative nature. Agreement within the State Government's key agencies/secretariats and with municipalities in the GVMR on adequate arrangements for integrated water management may not be reached.</p> <p>Project cost overruns. Project costs are not accurately estimated and actual costs are significantly higher than estimates.</p>	Rating:		Moderate	
	Risk Management: Physical household connections to sewerage networks will be included in the works contracts that are building the network, and related social and communication and outreach activities will be put in place before and during construction.			
	Resp: CESAN	Stage: Preparation and Implementation	Due Date: 01/31/2021	Status: In progress
	Risk Management: The Steering Committee will have representatives from each of the key sector secretariats and through SEPAM will coordinate with the GVMR Metropolitan Council (COMDEVIT) which has representation from the municipal level. Close follow up to technical assistance activities will ensure that diagnostics and proposed alternative arrangements have solid technical justifications and the Steering Committee will be in charge of coordinating discussions with the different stakeholders to reach a satisfactory agreement.			
	Resp: Steering Committee	Stage: Implementation	Due Date: 01/31/2021	Status: Not yet due
	Risk Management: Project cost estimates, particularly investment costs have been reviewed in detail with CESAN and are based on the engineering designs available and actual market costs that CESAN is currently incurring for similar works, plus contingencies. The UGP will closely monitor estimated versus actual costs, and in the event of significant overruns, work with the Steering Committee in finding an appropriate solution, which could range from increased counterpart funds or reduction in the project's overall scope.			
	Resp: Steering Committee and UGP	Stage: Preparation and Implementation	Due Date: 01/31/2021	Status: In progress
3.2. Social & Environmental				
<p>Description: The activities and works proposed under the project are not expected to generate negative environmental or social impacts. Nonetheless, some activities should be closely monitored to ensure that they do not lead to future safeguard risks.</p>	Rating:		Low	
	<p>Risk Management: The SES is preparing an environmental impact assessment that will evaluate and propose mitigation measures to the potential environmental impacts generated by the project. In addition, an environmental framework has been prepared and will be applied to components for which the specific works proposed will only be identified as a result of a study yet to be undertaken (i.e., the drainage master plan). The SES will engage in extensive consultation with project stakeholders on the results of the environmental assessment.</p> <p>Preliminary assessments indicate that there will not be involuntary resettlement of households. However, land acquisition and easements may still be required for wastewater treatment and collection works, as well as for potential drainage works; therefore, a Resettlement Policy Framework will be prepared to guide the resettlement process if this becomes necessary.</p>			

	Resp: Steering Committee	Stage: Preparation and Implementation	Due Date: 01/31/2021	Status: In progress
3.3. Program & Donor	Rating:	N/A		
Description: Not applicable (N/A)	Risk Management: N/A			
	Resp: N/A	Stage: N/A	Due Date: N/A	Status: N/A
3.4. Delivery Monitoring & Sustainability	Rating:	Moderate		
Description: The pilot demonstration project aimed at building a sustainable watershed-based water treatment model might not achieve results that can be replicated/scaled-up. 				

Annex 5: Implementation Support Plan

BRAZIL: Espírito Santo Integrated Sustainable Water Management Project

Strategy and Approach for Implementation Support

1. The strategy for the Bank's Project Implementation Support (IS) reflects the nature of the Project and its risk profile (outlined in the Project ORAF, Annex 4) and aims to enhance the quality of the client's delivery of proposed project interventions. As such, the IS focuses on risk mitigation measures identified in the ORAF and standard Bank supervision, including technical, institutional, environmental and social safeguards) and fiduciary aspects (financial management and procurement).
2. This Project builds upon the implementation experience of previous Bank projects in the State of Espírito Santo, namely the Espírito Santo Water and Coastal Pollution Management Project (P006522), its Additional Financing (P102818), the second Espírito Santo Water and Coastal Pollution Management Project (P087711) and the ongoing Espírito Santo Biodiversity and Watershed Conservation and Restoration Project (P094233). These projects have undertaken similar activities in water resource management, sanitation and reforestation and have worked with many of the same state agencies including CESAN and SEAMA. Similar to these projects, the proposed operation institutes a Steering Committee comprised of relevant State entities, heavily overlapping with the previously instated Steering Committees, thus reducing implementation risks. A single State entity (SEPAM) is in charge of overall project oversight and an independent Project Management Unit will be used, as with previous operations. Component 4 of this Project allocates funds to provide support and training to the State entities that comprise the project management unit to ensure strong implementation and sustainability of activities even after the project is closed.

Implementation Support Plan

3. Semi-annual Bank supervision (including field visits to investments financed under Components 1-4) would concentrate on the following areas:
 - **Strategic:** To the extent possible, supervision missions will meet with the Project Steering Committee to: (i) review project activities; (ii) reconfirm strategic alignment of the project's multisectoral aspects; and (iii) ensure the necessary coordination across respective stakeholders.
 - **Technical:** Supervision will concentrate on the implementation of the institutional strengthening, works and capacity building with regard to Components 1-3 as well as on ensuring the State's ability to provide quality assurance for the project's interventions, both within the GVMR as well as the more rural areas in the Santa Maria da Vitória and Jucu River basins and the Caparaó. Randomized field visits by the in-country Field Coordinator and team will serve to verify compliance with the Project Operational Manual and encourage adjustments to project design, as needed, given results on the ground. Integrated water management and disaster risk management specialists (Component 1), Sanitation specialists (Component 2), Environmental specialists (Component 3) will complement the Bank supervision team through short-term cross-

support and, as warranted, targeted engagement of external technical experts. Ongoing support by Bank specialists for monitoring and evaluation as well as contracted evaluation expertise, as needed, will strengthen the State's ability to both monitor project progress and assess the impact of interventions. The Bank team will review technical inputs including terms of reference and bidding documents of the Project Management Unit and State entities such as CESAN and SEAMA to ensure adequate technical specifications, proper assessment of the bids and commercial aspects.

- **Safeguards:** The Bank worked with and advised State representatives on the preparation and consultation of the Environmental Assessment and Resettlement Plan for the proposed project. This support will continue throughout project implementation with regard to the investments financed under the Project. The Bank also worked closely with the client's team in preparation and consultations will continue during project implementation.
- **Fiduciary:** The Bank will provide timely, targeted training to the client prior to project effectiveness and through periodic supervision during project implementation. These training courses and supervision will: (i) prepare State representatives to work with procurement under their respective investments, in compliance with the project Operational Manual; (ii) ensure the capacity of State entities to manage the flow of funds and accounting procedures, in line with financial management guidance; and (iii) work with SEPAM and co-executing agencies in building their overall financial management and procurement capacity to improve and facilitate project management. Supervision of the project's financial management arrangements would be conducted semiannually and as needed in response to client needs. Procurement supervision will also be carried out semiannually during regularly scheduled Bank supervision.
- **Client Relations:** The Task Team Leader (TTL) will: (i) coordinate Bank supervision to ensure consistent project implementation, as specified in the legal and project Operational Manual; and (ii) meet regularly with the client's senior representatives (i.e., SEPAM, CESAN, SEAMA/IEMA) to gauge project progress (including the mid-term review) in achieving the PDO and address implementation roadblocks, as they may arise.
- **Mid-Term Review:** A mid-term review will be carried out in the third year of project implementation in which a comprehensive review of the project implementation experience will be undertaken and adjustments made to improve the project's design and/or execution, if needed.

What would be the main focus in terms of support to implementation during:

Time	Focus	Skills Needed	Resource Estimate (Staff Weeks, SW)	Partner Role
First twelve months	Procurement Training, Procurement review of bidding documents	Procurement Specialist	5	UGP and implementing agencies trained
	Technical review of the terms of reference, technical reports and	Technical Specialists	10	

Time	Focus	Skills Needed	Resource Estimate (Staff Weeks, SW)	Partner Role
	bidding documents			
	FM training and supervision	FM Specialists	3	UGP and implementing agencies trained and equipped
	Social Safeguards – Supervision and Training	Social Specialist	2	UGP and implementing agencies trained, equipped and providing assistance to State agencies
	Gender Specialist	Gender Specialist	2	
	Environmental Safeguards – Supervision and Training	Environmental Specialist	3	
	Project Management and project supervision coordination	Task Team Leader	8	
After month 13	Procurement review of bidding documents	Procurement Specialist	3	N/A
	Technical review of the terms of reference, technical reports and bidding documents	Technical Specialists	8	
	FM training and supervision	FM Specialists	2	
	Social Safeguards – Supervision and Training	Social Specialist	2	
	Environmental Safeguards – Supervision and Training	Environmental Specialist	3	
	Project Management and project supervision coordination	Task Team Leader	8	

Skills Mix Required

Skills Needed	# Staff Weeks per FY	# Trips per FY	Comments
Task Team Leader (Supervision)	6	3	HQ-based
Procurement Specialist	3	2	Country-based
Financial Management Specialist	3	2	Country-based
Environmental Specialist	3	2	Country-based
Social Specialist	3	2	Country-based
Gender Specialist	3	2	HQ-based
Legal Counsel	3	1	HQ-based
Integrated Water Management Specialist (water resources and drainage)	3	2	Country-based
Sanitation Specialist	3	2	HQ-based
Natural Resources Management/PES Specialist	3	2	HQ-based
Disaster Risk Management Specialist	3	2	HQ-based
Monitoring/Evaluation Specialist	3	2	HQ-based

Partners

Name	Institution/Country	Role
Project Oversight	SEPAM	Provide overall project oversight
Water and Sanitation Partners	CESAN, SEDURB	Implement sanitation works, planning and State sanitation strategy
Environmental Partners	SEAMA/IEMA	Implement Payment for Environmental Services
Private Sector Partners	TBD	Commercial partners to support the State's implementation and supervision of works.

Annex 6: Economic and Financial Analysis

BRAZIL: Espírito Santo Integrated Sustainable Water Management Project

Project Economic and Financial Analysis

Summary

1. A cost-benefit analysis was used to determine the financial and economic feasibility of the project, and evaluate the risk profile of the investment. The economic analysis shows that components 2 and 3 are likely to generate benefits well in excess of their costs, and that component 1 will position the SES to substantially reduce the impacts of possible future disasters.

Project Objective and Components

2. *The objective* of the project is to improve sustainable water resources management and increase access to sanitation in the State of Espírito Santo. It will be achieved by: strengthening the State's water sector institutions, providing increased wastewater collection and treatment services, supporting reforestation and sustainable land management practices, and improving the state's capacity to identify, monitor and prepare for disaster risks. The project will enhance the access to sanitation services and support a move towards a long-term, innovative approach to integrated water management and a more systematic approach to DRM.

3. The project consists of four components (Table A6-1). This evaluation focuses primarily on component 2 (efficient water supply services and increased access to sanitation), which accounts for 67 percent of total project costs of US\$323.10 million, and on component 3 (watershed management and restoration of forest cover), which accounts for another 7 percent of total project costs.

Table A6-1: Estimated costs by component

<i>Component</i>	<i>Million US\$</i>	<i>% of total</i>
1. Integrated water management and disaster risk management	59.5	18
2. Efficient water supply services and increased access to sanitation	215.6	67
3. Watershed management and restoration of forest cover	23.6	7
4. Project management and supervision	23.8	7
Total	322.5	100.0

Component 1: Integrated water management and disaster risk management

4. Component 1 supports activities aimed at (i) improving water resources management, particularly in the areas of planning and monitoring to allow for the integration of policies concerning water resources, water infrastructure and the environment; (ii) improving metropolitan coordination and planning mechanisms for the management of urban water; and (iii) developing adequate planning and monitoring instruments for risk reduction as well as preparedness and response to adverse natural events.

5. The nature of the activities supported by Component 1 precludes a full economic analysis. However, these activities are expected to provide important benefits to the SES by improving the management of water resources as well as developing adequate planning and monitoring instruments for risk reduction as well as preparedness and response to adverse natural events.

6. Risk mitigation investments covered under this component include the development of an integrated early warning and response system as well as capacity building in disaster risk management. The benefit of the overall risk mitigation investment is the avoided cost of damage and losses as a result of this component. During the period 2000-2009, average damages and economic losses due to natural disasters in Espírito Santo are estimated at US\$71.94 million. However, the estimation of the benefits of DRM investments is complicated given their probabilistic nature.

7. *Justification for public sector provision.* Resources under this component are targeted at correcting public sector failure, such as strengthening and increasing the efficiency of the State's Environmental Secretariat for adequate management of water resources as well as the development and use of instruments for risk reduction and responding to adverse natural events.

8. *World Bank value added.* As Brazil and the SES move towards a culture of disaster prevention, the Bank is uniquely positioned to provide expert technical input based on the lessons learned from 25 years of Bank operations and programs in the area of disaster risk management and make the shift towards an approach for comprehensively managing disaster risk. In addition, the Bank team also has extensive accumulated experience in water resources management and integrated urban water management in order to ensure that the activities and studies being planned are pragmatic and will yield on-the-ground results in terms of improved water management.

Component 2: Efficient water supply services and increased access to sanitation

9. Component 2 supports a variety of activities aimed at increasing the efficiency of water supply services and increasing the coverage of sewage collection and treatment services in the SES. Sewerage investments in the GVMR and in nine municipalities located in the interior of the State account for the bulk of the component's cost (US\$205.5 million of US\$215.7 million); the analysis focuses on these investments.

10. *Justification for public sector provision.* Component 2 is aimed at remedying market failures; without an intervention, these market failures would continue to generate negative externalities for the environment and the population without access to sewerage services. Given the high investment costs associated with sewerage provision, it would be prohibitive, particularly for low income households, to finance via the tariff such large investments. As such public subsidies are needed in order to ensure adequate sanitation coverage and affordable services to the poor.

11. *World Bank value added.* Aside from the extensive experience and sector expertise from our global interventions on utility management and provision of sanitation services, the Bank can particularly contribute and add value to the execution of this component through innovative and efficient procurement and contracting arrangements for the large works to be implemented, such as turnkey contracts.

12. *Current situation of the sanitation sector.* Sewerage coverage remains relatively low in the SES, with the exception of parts of the GVMR (Table A6-2), due to: (a) low or inexistent sewerage coverage; (b) low or inexistent sewage treatment; and (c) low response of households to connect to the sewerage system even in areas where the network exists.

13. *Impact of the project.* Without the project, there would be no improvement in sewerage coverage, and the number of people not connected would gradually increase as the population grows.³⁰ The project's investments under component 2 are expected to increase sewerage coverage in the affected areas substantially (Table A6-2).

14. *Operating costs and revenues.* Operating costs projected for the “with” and “without project” situations are estimated according to the investments planned for each locality. For the without project situation, operating costs are projected based on CESAN's current operating costs in each of the localities where the service is provided. Operating revenues are based on the projected number of connections and the new tariff approved by ARSI, which increase sewerage rates by 26 percent in 2014, relative to rates in 2011. Table A6-2 shows the projected annual operating costs and revenues for each of the systems. Overall, the net present value of sewerage tariffs collection is estimated at US\$148 million.³¹ In all cases, the projected revenues exceed the projected operating costs, indicating that operation of the new infrastructure, once it has been built, will be financially sustainable for CESAN.

15. *Economic costs and benefits.* In addition to the revenues collected from sewerage tariffs, increased sewerage coverage is expected to result in a reduction in the incidence of gastrointestinal disease. In turn, this results in avoided treatment costs and loss of wages. The benefits of the project are estimated using data from a study of the economic benefits of sewerage expansion in Brazil (Trata Brasil, 2010), which provides estimates for each state. In each case, the benefits were estimated by adjusting the estimated benefit to 2012 prices, and applying it to estimated number of project beneficiaries (taking into account population growth). Benefits were estimated over a 30-year period, and discounted at 10 percent.


- a. Connecting a dwelling to sewerage results in a 39 percent decrease of gastrointestinal infections. In Espírito Santo, the annual number of occurrences of gastrointestinal disease is 6,108, and the average treatment cost is R\$568/incidence (in 2009 prices). With these assumptions, the estimated present value of health benefits at 2012 prices is about US\$1 million.
- b. Households in Espírito Santo that are newly connected to sewerage would also experience a 3.5 percent increase in their average monthly income (thanks to avoided time lost to illness), estimated at R\$868 per household (in 2009 prices). The estimated value of this benefit is about US\$169 million.

³⁰ Current coverage is 36 percent in the project areas of the GVMR, and 11 percent in the interior. Yet only 60 percent of dwellings are actually connected to the network, turning the percentage of effective coverage to 21 percent in the GVMR and 9 percent in the interior. With the project, the network will be expanded to 63 percent of households in the areas in the GVMR, and 100 percent in the interior; and increase the connection rate from current 60 percent to 90 percent in the specific areas of intervention in the GVMR.

³¹ Note that tariff revenue is not an economic benefit; it is a transfer payment from consumers to CESAN.


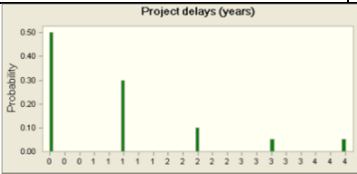
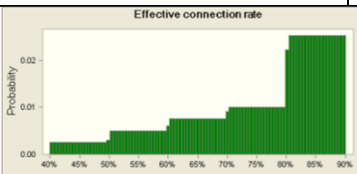
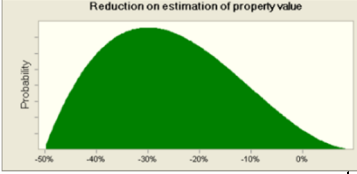
- c. In Espírito Santo, a sewerage connection increases the property value of a dwelling (estimated in R\$75,000 in 2012 prices³²) by 3.4 percent. The estimated value of this benefit is about US\$85 million.
 - a. The property value of the dwellings located nearby current sewage discharges will increase when wastewater is treated. It is estimated that the costs caused by proximity to an odor emission source ranges from about 3% to 10% of the value of real state (Longo and Hughes 2010). The estimated value of this benefit is about US\$55 million.
16. Thus the benefits obtained from health improvement and higher income from avoided loss of working days (US\$170 million across all sites), would be sufficient to justify the project's investments and operating costs, as they exceed their present value during the lifetime of the project (US\$162 million). Adding the increase in property values further increases this margin.³³
17. The economic analysis of component 2 thus shows a net economic benefit of US\$139 million and an internal rate of return of 37 percent. The distributive analysis shows that customers receive the bulk of benefits (US\$138 million). The government, however, will bear net costs of about US\$89 million, as a result of having to bear the investment costs.
18. The financial analysis of component 2 shows that revenues from tariffs are not enough to cover investment and operating cost generating a net financial loss of US\$54 million. When subsidy from the Government is included, the project generates positive returns of US\$66 million, as revenues from tariffs are higher than operating cost.
19. *Sensitivity.* These results are robust to significant changes in assumptions. Costs would have to increase as much as 100 percent, for example, for the component to become non-viable, or the effective connection rate would have to fall below 50 percent.
20. *Risk.* To enhance the accuracy of the financial and economic analysis, a risk analysis was carried out using the Crystal Ball. This software works with Monte Carlo simulation sampling probability distribution for each of the variables selected and produced hundreds or thousands of possible outcomes. The assumed probability distributions and their respective specifications for each variable are as follows.

Probability Distribution selected for each variable

Investment Cost Overrun		Triangular distribution with parameters: Minimum -15% Likeliest 0% Maximum 30%
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³² The property value at 2012 prices was obtained from information provided by local state agencies.

³³ However, it is not evident that it is appropriate to add the increase in property values, as it might in part reflect a willingness to pay for a healthier environment with a lower likelihood of illness. To the extent that this is true, adding the entire amount of property value increase may represent double-counting of benefits. However, part of the increase in property values represent benefits not captured in health benefits, such as reduced odors.

<i>Operating Cost Overrun</i>		Triangular distribution with parameters: Minimum -15% Likeliest 0% Maximum 30%																		
<i>Project Delay</i>		Custom distribution with parameters: <table><tr><th>Value</th><th>Probability</th></tr><tr><td>0</td><td>0.50</td></tr><tr><td>1</td><td>0.30</td></tr><tr><td>2</td><td>0.10</td></tr><tr><td>3</td><td>0.05</td></tr><tr><td>4</td><td>0.05</td></tr></table>	Value	Probability	0	0.50	1	0.30	2	0.10	3	0.05	4	0.05						
Value	Probability																			
0	0.50																			
1	0.30																			
2	0.10																			
3	0.05																			
4	0.05																			
<i>Connection Rate</i>		Custom distribution with parameters: <table><tr><th>Minimum</th><th>Maximum</th><th>Probability</th></tr><tr><td>40%</td><td>50%</td><td>0.05</td></tr><tr><td>50%</td><td>60%</td><td>0.10</td></tr><tr><td>60%</td><td>70%</td><td>0.15</td></tr><tr><td>70%</td><td>80%</td><td>0.20</td></tr><tr><td>80%</td><td>90%</td><td>0.50</td></tr></table>	Minimum	Maximum	Probability	40%	50%	0.05	50%	60%	0.10	60%	70%	0.15	70%	80%	0.20	80%	90%	0.50
Minimum	Maximum	Probability																		
40%	50%	0.05																		
50%	60%	0.10																		
60%	70%	0.15																		
70%	80%	0.20																		
80%	90%	0.50																		
<i>Reduction on benefits</i>		Beta distribution with parameters: Minimum -50% Maximum 10% Alpha 2 Beta 3																		

21. The results for the economic analysis show a very sound project with 90 percent probability of having positive results.

Table A6-2: Current and expected sewerage coverage

Table 16-27. Current and expected sewerage coverage									
		Estimated costs and revenues (US\$ million)				Sewerage coverage		Effective connection rate	
			Annual				With		With
Municipality	Planned sewerage and treatment works	Investment costs	Operating costs ^a	Annual Revenues ^a	Beneficiary population	Current (%)	project (%)	Current (%)	project (%)
Greater Vitoria Metropolitan Region (GVMR)									
Cariacica	Expansion Bandeirantes	32.4	4.9	10.7	31,100	39	68	51	90
	Expansion Nova Rosa Penha		3.5	6.7	5,173	39	100	51	90
Vila Velha	Expansion Araçás	62.9	8.4	17.3	29,872	33	66	68	90
	Expansion Ulisses Guimarães	60.1	0.1	0.3	41,915	33	100	68	90
Total GVMR		155.4	0.2	0.5	108,060	36	63	60	90
Interior			0.2	0.5					
Conceição do Castelo	Expansion	5.5	0.1	0.3	4,859	17	100	0	90
Divino São Lorenzo	New system	3.0	0.0	0.2	2,041	0	100	0	90
Dores do Rio Preto	New system	2.4	0.1	0.6	2,197	0	100	0	90
Ibatiba	New system	11.2	0.4	1.4	13,378	0	100	0	90
Irupi	New system	3.4	0.5	1.3	4,461	0	100	0	90
Iúna	New system	9.6	0.2	0.7	13,792	0	100	0	90
Marechal Floriano	New system	6.0	1.8	5.8	5,461	0	100	0	90
Santa Leopoldina	New system	5.0	10.3	23.1	2,776	0	100	0	90
Santa Maria de Jetibá	Expansion	4.0	4.9	10.7	7,460	45	100	100	90
Total interior		50.1	3.5	6.7	56,425	11	100	85	90
Total		205.5	8.4	17.3	164,485	34	65	60	90

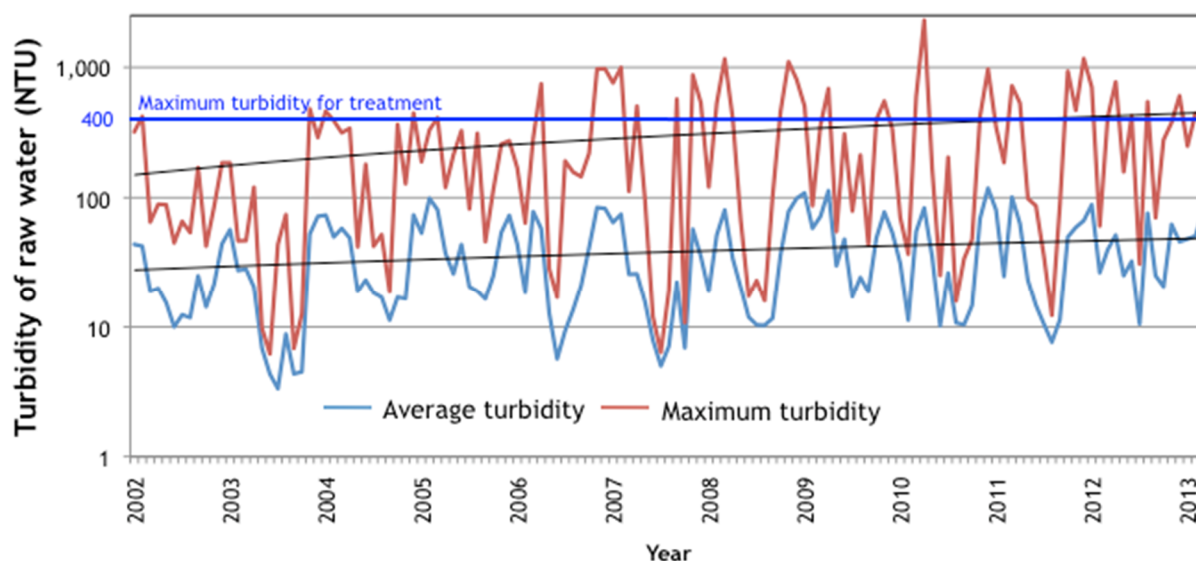
Notes: a. Present value discounted at 10 percent over 30 years.

Component 3: Watershed management and Restoration of Forest Cover

22. This component will focus on improving land use in upper watershed areas so as to improve water quality for downstream water users in the GVMR (primarily by reducing the silt loads in surface water) and generate new opportunities and revenue for rural producers. It will do so, inter alia, by supporting the following SES programs: (a) *Reflorestar* – to induce land use change in the target watersheds using Payments for Environmental Services (PES); and (b) the Mangaraí River Pilot – which seeks to reduce silt originating in the Mangaraí River sub-watershed through a holistic approach that combines reforestation and improved land management (through the *Reflorestar* program) with a range of other interventions, such as improvement to roads and sanitation in the watershed. The Mangaraí sub-watershed, which has been identified as one of the primary sources of sediment affecting CESAN’s water intake in the Santa Maria River, which provides 32 percent of the water used in Grande Vitória. The component’s activities would eventually be extended to other parts of the Santa Maria watershed, and to other watersheds. The analysis here focuses solely on the activities in the Mangaraí sub-watershed.

23. Sediment loads in the Santa Maria river have increased over the years, causing significant problems to the water sector. CESAN draws water from an intake at Santa Maria to supply the Carapina and Santa Maria treatment plants, which together produce almost 40 percent of Vitória’s water and serve over 35 percent of its population. Figure A6-1 shows how average and maximum turbidity have increased in the last decade. Average turbidity was about 28 NTU in 2002-03, but almost 50 NTU in 2012-13. Sediment loads also affect two hydroelectric plants (Rio Bonito and Suíça) along the river; and the Port of Vitória, where the river ends its journey.

Figure A6-1: Turbidity of water delivered to the Carapina Treatment Plant



24. *Justification for public sector provision.* Component 3 is aimed at remedying market failures; without an intervention, these market failures would continue to generate negative externalities for downstream water users. In principle, a user-financed system of payments for

environmental services (PES) could be developed, and indeed that was the plan under the previous *Espírito Santo Biodiversity and Watershed Conservation and Restoration Project* (P094233), which initiated the work on a PES program for the watersheds supplying Vitória. As the SES had also, in parallel, developed its *ProdutorES de Água* program (now replaced by the *Reflorestar* program), it was more efficient to rely on that program for field arrangements. CESAN will, however, provide funding for activities in the watersheds, complementing funding from Fundágua.

25. *World Bank value added.* The World Bank has accumulated considerable knowledge and experience in the design, implementation, and support of PES programs in developing countries. Nine Bank-financed projects that use PES are currently under implementation in LCR, making payments of over US\$100 million a year and conserving over 2.5 million ha of forest. In parallel, the Bank has been undertaking research on PES and sharing the results with practitioners through capacity building efforts. No other institution has the same depth of experience in implementing PES approaches.

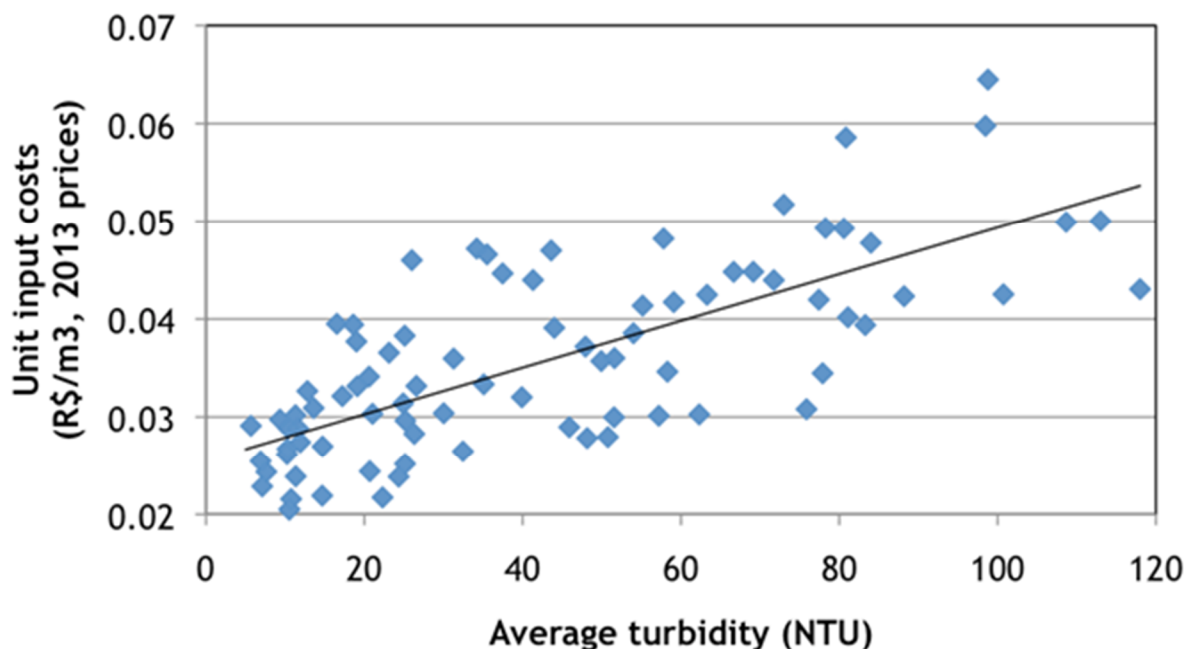
26. *Without project.* The turbidity of the water used in the Santa Maria water system has increased substantially over the years (Figure A6-1). Average turbidity levels doubled from 2002-03 to 2011-12, increasing water treatment costs. CESAN invested R\$2.8 million in 2005 to install dissolved air flotation units at the Carapina Treatment Plant to reduce input costs, but as shown in Figure A6-2, input costs are still strongly affected by average turbidity levels.³⁴ Filters must also be cleaned much more frequently at times of higher turbidity, further increasing costs. Furthermore, treatment must be interrupted when turbidity exceeds about 400 NTU, potentially resulting in service interruptions.³⁵ As can be seen in Figure A6-1, turbidity peaks have become both higher and more frequent. Treatments were interrupted four times due to excessive turbidity in 2012.

27. Without improved management in the Santa Maria da Vitória watershed, it is likely that these costs would continue to increase, as they have throughout the last decade. From Figure A6-1, average turbidity had doubled to just under 50 NTU in the last decade. From Figure A6-2, this has resulted in average treatment costs increasing by about R\$0.01/m³, even after a R\$3 million investment in air flotation units designed to reduce treatment costs (about R\$4 million in 2012 prices). At current production levels of about 60 million m³, this increase in turbidity has thus increased treatment costs by about R\$0.6 million a year.

³⁴ The data in Figure A6-2 are for the period 2006-2013, and thus incorporate the effect of the air flotation units.

³⁵ The Santa Maria treatment plant, which also draws its water from the same intake, is less vulnerable to interruptions because its newer design allows treatment at turbidity levels up to 1,000 NTU. Moreover, Santa Maria is much smaller, with less than 10 percent of Carapina's capacity.

Figure A6-2: Impact of turbidity on water treatment costs at Carapina



Note: Data from 2006-2013, following installation of air flotation units at Carapina

Source: World Bank calculations based on data from CESAN.

28. Without intervention, it is assumed that average turbidity would continue to increase according to the trend observed in the last decade, reaching about 80 NTU in a decade and causing average input costs for water treatment to increase by an additional R\$0.01/m³. At current average annual production levels of about 60 million m³, this would increase annual input costs for water treatment by about R\$0.6 million at Carapina within a decade and about R\$1 million by 2030. Beginning in 2018, CESAN is planning to ramp up annual production at Carapina from 60 million m³ to 115 million m³ by 2030. Taking this increased production into account, the additional costs will reach almost R\$2 million a year in 2030. Further investments in filtration measures are likely to be required to keep pace with rising average turbidity levels, probably at about 10-year intervals. Assuming such investments are similar in magnitude to those in air flotation units, the additional cost would come to about R\$2.4 million in present value terms. The higher peaks of maximum turbidity, and their increased frequency, impose additional costs.

29. The Port of Vitória is also likely to suffer from the need for more frequent dredging to maintain the water depth necessary for the safe passage of ships. Current annual dredging costs average about R\$1.5 million (US\$2.6 million), but are expected to increase to about R\$2.5 million once the on-going program to deepen and widen the shipping channel is completed.

30. *With project costs.* (1) *Reflorestar* would support a mix of productive practices (agroforestry, silvopastoral practices) and pure conservation practices (reforestation of riparian corridors) that would reduce erosion compared to current practices. Landholders would be offered payments ranging from R\$2300/ha (about US\$1150) for natural regeneration to R\$7200/ha (about US\$3600) for adoption of agroforestry, over three years, with pure conservation uses also receiving longer-term payments of US\$90-110/ha/year to maintain forest

cover. We use as an illustrative example a farm adopting agroforestry on 1 ha, silvopastoral practices on 2 ha, and regenerating forest on 1 ha, and which also has 1 ha of standing forest eligible for a conservation payment; it would receive total payments of about R\$16,400 (about US\$8200), and conservation payments of R\$295/year (US\$145/year). About 15-20 percent (about 2,600-3,500 ha) of the Mangaraí sub-watershed would need to be conserved or converted to less erosive uses to achieve substantial reductions in erosion, assuming the most erodible areas are targeted.³⁶ The total cost of payments would thus be about US\$5.6 million to US\$7.9 million in present value terms over 30 years.

31. The transaction cost of implementing the program would increase total costs to about US\$7.5 million to US\$10.6 million.³⁷ (2) Table A6-4 shows the other investments that would be undertaken in the Mangaraí watershed with the aim of reducing erosion and improving water quality downstream, and their expected cost. Adding the cost of these measures would further increase the total cost in Mangaraí by about R\$4.11 million, or US\$2.2 million. The total cost of activities in Mangaraí would thus be about US\$9.7 million to US\$12.8 million.

Table A6-4: Other investments in Mangaraí watershed

<i>Activity</i>	<i>Estimated cost (R\$ million)</i>
Diagnostic and detailed investment plan	0.45
Community water and sewage treatment	0.50
Restoration of rural roads (including installation of sediment traps)	2.60
Community education	0.56
Total	4.11

32. *With project benefits.* The planned interventions would generate three main benefits:

- a. CESAN would benefit from reduced water treatment costs. There is considerable evidence, from Espírito Santo itself, other sites in Brazil, and elsewhere in the world, that turbidity levels are closely related to erosion in the watershed.³⁸ It is difficult to predict how much turbidity might fall with improved watershed management. If the interventions succeed in stabilizing turbidity at current levels (that is, avoid any further increase in turbidity), they would result in savings in average input costs at Carapina alone of R\$8.2 million (US\$4.3 million) over 30 years.³⁹ Stabilizing turbidity at current levels would avoid the need for further investments in new filtering equipment, resulting in additional estimated savings of R\$2.4 million (US\$1.2 million) in present value terms. Further savings would come from reductions

³⁶ The area that would need to be conserved or converted to improved land uses to have a meaningful impact on sediment loads is not yet known; a hydrological model is being developed that will allow this area to be estimated. Here we use the upper end of the likely range so as to have more conservative estimates of expected project benefits.

³⁷ Based on current *Reflorestar* transaction costs of about R\$1000/ha. It may be possible that average costs would be lower in Mangaraí because of a greater concentration of contracts in a small area.

³⁸ Teixeira and Senhorelo (2000; cited in Hercowitz and Figueiredo, 2011) find that turbidity is closely correlated to sediment transport in the Jucu watershed. Similar results were obtained in watersheds in Rio Grande do Sul by Chaves (2010) and Carvalho and others (2004). The proportion of sediment eroded that finds its way to river outlets tend to be higher in smaller watersheds such as that of Mangaraí (Walling, 1999).

³⁹ The benefits of reduced turbidity would have been higher had conservation measures been undertaken prior to the 2005 investments in additional filtration units, as unit water treatment costs were higher then; moreover, the capital cost of the additional filtration units would also have been saved.

in the number of interruptions in treatment, in avoiding the higher costs for washing filters, in reduced need for additional investments in storage capacity. In the absence of strong data on the magnitude of these costs and how they would have increased, we round up total benefits to US\$6 million. If the measures being undertaken succeed in actually reducing turbidity from current levels, the benefits would be higher. Returning average turbidity levels to those observed at the beginning of the century would reduce the cost of inputs for water treatment by R\$5.5 million (US\$2.9 million) over 30 years, bringing total benefits to almost US\$9 million.

- b. The Port of Vitória would also benefit from reductions in sediment delivery, by avoiding the need for more frequent dredging. There are no data on which to base predictions of possible sedimentation impact due to watershed degradation in the new, deeper channel. If dredging costs would have risen by 20 percent over the next thirty years in the absence of watershed conservation, maintaining sediment loads at current levels would avoid about R\$3.6 million (US\$1.9 million) in additional dredging costs.⁴⁰
- c. Participating landholders would benefit from increased income, partly from the payments they receive to maintain protective land uses such as forests, but mostly from the higher profitability of land under agroforestry or silvopastoral practices.⁴¹ IEMA estimates that annual income (including payments) on a typical 15 ha farm would increase from about R\$10,000 to about R\$12,000 within 3 years and to about R\$22,000 in 10 years. Assuming, conservatively, that net income increases by only 10 percent of these amounts, income would increase by about R\$2,900/ha (US\$1,500/ha) in present value terms, over 30 years, or a total of about US\$6.8 million over the area covered by the project in Mangaraí.

33. Total benefits for Component 3 activities in the Mangaraí sub-watershed are thus estimated to be about US\$13 million to US\$15.5 million, assuming that turbidity is stabilized at current levels, or about US\$15.9 million to US\$18.4 million if turbidity is reduced to the levels observed a decade ago.⁴² Even at the lower estimate, these benefits exceed the estimated US\$9.7 million to US\$12.8 million costs for this component's activities in the sub-watershed, giving an NPV of about US\$2.9 million to US\$3.7 million (with IRR of 12.7 to 14.1 percent) if turbidity is stabilized at current levels and of about US\$5.8 million to US\$6.5 million (and IRR of 15.6 to 16.8 percent) if it is reduced to the levels of a decade ago.

34. The bulk of benefits would be received by CESAN (US\$5.5 million to US\$8.4 million) in the form of reduced treatment costs and avoided investments and by participating landholders (US\$5.6 million to US\$7.9 million) in the form of higher income from farming activities. The bulk of costs would be borne by the SES (via the Fundágua fund), through its support to the *Reflorestar* program and other investments. The financial burden of long-term conservation

⁴⁰ The two hydroelectric power plants in the Santa Maria da Vitória watershed are also affected by sedimentation. However, they are both located higher in the watershed, and so would not benefit from conservation in the Mangaraí micro-watershed. They might benefit if the program were later expanded to other parts of the watershed.

⁴¹ Although these practices are profitable, they are not adopted because of the high initial investments required; the project's payments would help overcome this constraint.

⁴² Although the Mangaraí sub-watershed is only part of the Santa Maria watershed, it has been identified as a principal source of the sediment affecting water turbidity at the Santa Maria intake. Many of the proposed land use changes would reduce erosion in Mangaraí, thus offsetting possible increases in erosion elsewhere in the watershed.

payments would fall on Fundágua, but would be relatively low (less than US\$200,000/year) and easily borne, given Fundágua's budget of about US\$2.5 million a year.

35. *Sensitivity.* These results are robust to significant changes in assumptions. In part, this is due to the costs and benefits of land use changes being tied together: if adoption is lower than forecast, the benefits would decline (as the impact on erosion and the increase in landholder benefits would be lower), but so would the costs (as both payments and transaction costs would decline). The component would still be economically beneficial even if the estimated benefits of the new practices to landholders were reduced by a third.

Financial Analysis of CESAN

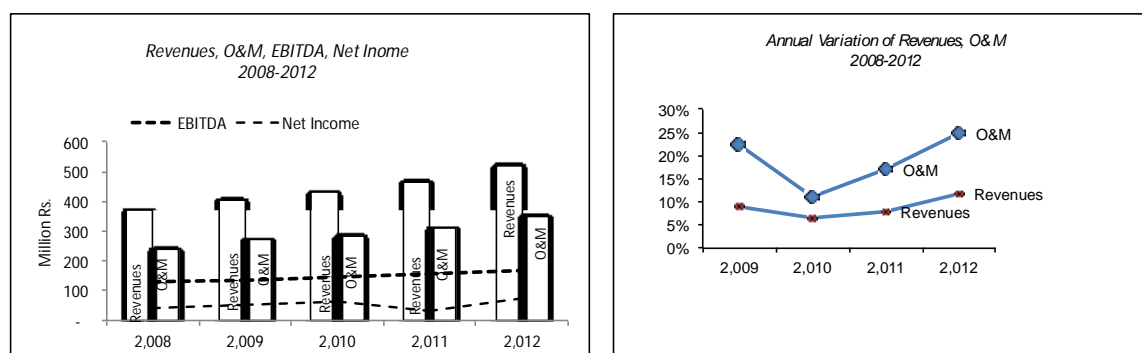
36. The financial analysis allows evaluating CESAN's financial capability for sustaining and operating the project. The World Bank loan will be paid by the SES and therefore is not included in the analysis. This assessment differs from the financial analysis of the project as it takes into account not only the project, but also all other operations that CESAN is planning to implement.

37. This analysis is based on the audited financial statements from 2008 to 2012, and the projected financial situation according to CESAN's forecasts. A sensitivity analysis was carried out to assess the financial impact when changes on transfers from the Government occur, and when a potential planned concession of sewerage service is awarded to private sector.

38. *Financial Performance 2008-2012.* In general terms the historic financial performance of CESAN in the previous shows a stable situation. Operating and net profits have been generated in all the period. Revenues cover operating and financial expenses, and allow a tiny margin to finance a portion of the investment. The State Government has funded an important percentage of the investment, through transfers, some of which have been converted to shares. The cash flow generated from operation has been enough to cover debt obligations. The capital structure shows a sound situation with debt indicators within acceptable levels for the industry's standards.

39. During the period, the income statement shows an average operational margin of about 16 percent and a net margin of 12 percent. In 2011 net income dropped to 7 percent, most likely as the result of the initiation of the tariff restructuring process, and in 2012 it presented previous levels. This illustrates that tariffs cover not only operating and financial cost but also allows a remnant of about 20 percent to finance investment (More details of financial statements and indicators in Attachments 1 and 2). Revenues have increased steadily on about 10 percent per year, which corresponded to 2 percent real increase after adjusting for inflation. Operating expenses on the other hand have had a more erratic fluctuation with the lower increase in 2010.

Figure A6-3: Historic Financial Performance of CESAN



40. The tariffs have been adjusted annually to cover mainly adjustment for inflation. The actual increase in revenues is explained in expansion of the services and higher volume of water and sewerage billed.

41. From 2008 to 2012, the SES has provided funds in the amount of R\$482 million to finance about 50 percent of the company's capital expenditures. Of these transfers 21 percent have been converted into shares and the remaining 79 percent have been registered as a grant without financing charges for CESAN. The remaining of investment cost has been financed with CESAN's own resources, and 25 percent with debt. The capital structure of CESAN shows 40 percent debt and 60 percent equity. Interest payments have been in average 4 percent of billed revenues.

42. Projected Financial Situation. Projections of CESAN's future financial situation included: (i) the tariff framework recently established by the regulatory agency-ARSI; (ii) the investment plan and associated targets in service expansion and unaccounted for water; and (iii) the proposed financing plan.

43. In June 2011, ARSI approved a comprehensive new tariff structure with a clear subsidy framework.⁴³ In the Resolution, ARSI defined the scheme for gradual implementation of the new structure until August 2014, when the new tariffs should be in place. The main changes are as follows: (a) a social tariff is established, with beneficiaries being those customers who belong to the Federal Program known as Bolsa Familia (Family Grant); (b) all other residential customers are grouped in one category; eliminating the previous four categories; (c) industrial and commercial customers are also grouped in one category; (d) the tariffs for sewerage and wastewater treatment will be 80 percent of the water tariff for the residential sector and 100 percent for non-residential customers in 2014; increasing gradually from current percentages (52 percent to 79 percent depending on the category) – the tariffs for sewerage (with no sewage treatment) correspond to 25 percent of water tariffs for all categories of customers; (e) water and sanitation tariffs will be the same for all municipalities, eliminating the differences that exist between the GVMR and others; (f) the subsidy on the social tariff will be applicable as discount on residential tariff, as follows: up to 15 cubic meters per customer per month the discount will be 60 percent; from 16 to 20 cubic meters the discount will be 20 percent; and for consumption higher than 20 cubic meters there will be no discount.

⁴³ Resolucao ARSI-Agencia Reguladora de Saneamento Basico e Infraestrutura Viaria do Espirito Santo. do de No 012, de 14 Junho de 2011.

44. The resulting increase on the sewerage tariff will be of about 26 percent in real terms, as it goes from current 71 percent of water tariff to 90 percent in 2014.

Table A6-3: CESAN's Tariff Increase

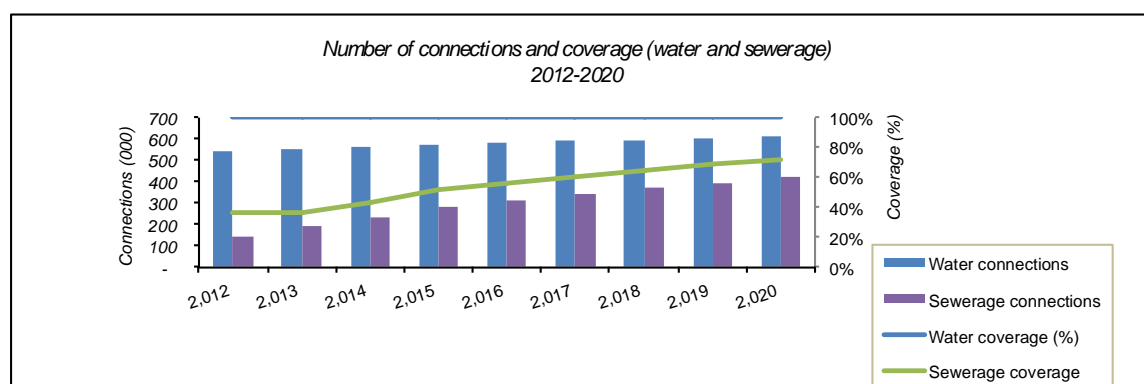
	2011	2014	Increase
Average water tariff (R\$/m ³)	2.12		
Average sewerage tariff R\$/m ³)	1.51	1.91	26%
Sewerage tariff/water tariff (Percentage)	71%	90%	

45. The increase in sewerage tariff will have an important impact on revenues, as most of the investment program will go to sewerage and sanitation expansion. Sewerage coverage will increase from 34 percent to 72 percent by 2020 (Figure A6-4). Water coverage is already universal and it is expected to expand at the same pace as population. Results show that projected sewerage revenue will have a 54 percent real increase from 2011 to 2014, as consequence of tariff and coverage increases. Water revenues, on the other hand, will increase with population growth.

Table A6-4: CESAN's Revenue Increases 2011-2014

	Real Revenue Increase
Water revenue Increase	8%
Sewerage revenue Increase	54%
Other revenue Increase	10%
Total revenue Increase	16%

Figure A6-4: CESAN's Water and Sewerage Connections and Coverage



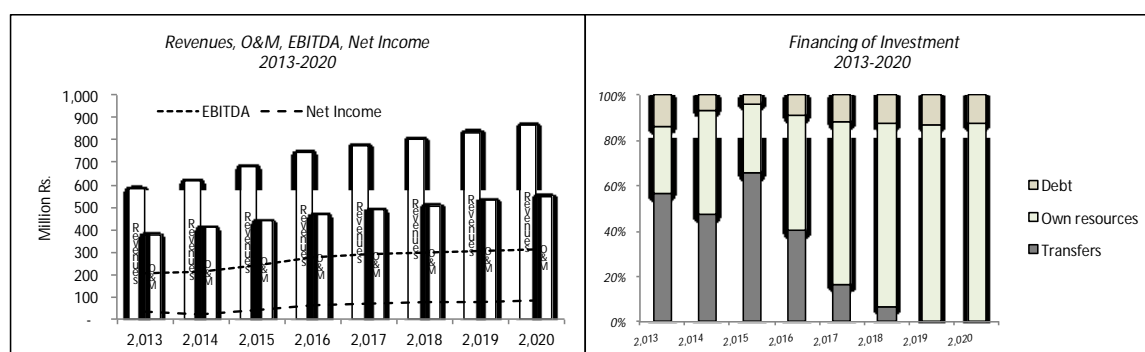
46. *Investment Program 2013-2017.* CESAN has an investment plan that is estimated to cost R\$1,485 million (about US\$765 million) for the next five years; 33 percent of which will go to the water sector, 60 percent to sewerage and wastewater treatment, and the remaining 7 percent to institutional strengthening. According to CESAN's projection 47 percent of the investment plan will be financed through transfers from the State Government; 9 percent with loans; and the remaining 44 percent from CESAN's own resources.

47. *Results of the financial projection.* The base case scenario includes the increase in tariffs approved by ARSI; the projected investment plan and its associated targets; and the financing plan with 47 percent of investments financed by the State Government. The results show that EBITDA⁴⁴ will maintain its current level of about 15 percent during the whole period. Net

⁴⁴ EBITDA: earnings before interest, taxes, depreciation and amortization. The term is arrived at by subtracting operating expenses from operating revenues.

margin will increase from 3 percent in 2013 to 9 percent at the end of the period (Figure A6-5). The percentage of cost recovery will maintain its current level of about 120 percent, which means that tariffs will be enough to pay for all operating costs with a 20 percent margin to fund investment costs. The capital structure will show a sound position with debt participation of 30 percent of assets and equity with the 70 percent remaining. This structure will be even better than shown in previous years.

Figure A6-5: Results of CESAN's Financial Projections



48. *Sensitivity Analysis.* The financial situation of CESAN can deteriorate if some changes occur in the variables included in the base case scenario. Two variables were evaluated as those of having the highest risk for the financial feasibility of CESAN: (i) a concession of the sewerage service to a private operator in the Municipality of Serra; and (ii) a decrease of transfers from the State Government to finance investments.

- a. Private sector participation (PSP): CESAN is inviting the private sector to build and operate the systems needed for improving service provision, such as coverage expansion of sewerage and wastewater treatment services. Serra has been selected as a municipality with special conditions for a PSP transaction, and feasibility studies have been carried out by CESAN. Preliminary conditions for a 30-year contract have been published on the web as well as the payment scheme, which consists of both fixed and variable payments according to the volume of wastewater treated.⁴⁵ CESAN will retain the responsibility of billing the customers under PSP contract, and at the same time, will be fully responsible for all the payments to the private operator, with no funding from the Government.

The preliminary conditions established in the draft contract show that the tariffs collected would be lower than the payments CESAN has to make to the operator. This will bring a financial burden for CESAN as the sewerage tariff does not cover the full cost of providing the service, since the PSP payments correspond to both investment and operating costs. By year 10 of the concession, the share of the payments to the operator will be 27 percent of operating costs and 23 percent of total revenues, and they alone will be 64 percent of total sewerage revenues of CESAN.

Results show that EBITDA will gradually decrease and become negative with a net loss of 4 percent on average and by 2020 the loss will represent 9 percent of revenues. The

⁴⁵ CESAN. Plano de Negocios Referencial para a concessão administrativa dos serviços de saneamento no sistema de esgotamento do município de Serra. 2012

operating cost recovery will decrease from 115 percent in 2012 to less than 100 percent in 2020, signaling that tariff increases will be required in order to maintain the company's long-term financial sustainability.

Table A6-5: Impact of payments of PSP on CESAN's financial accounts

	<i>Year 1</i>	<i>Year 5</i>	<i>Year 10</i>
Share on total operating costs (%)	7%	17%	27%
Share on total operating revenues (%)	5%	13%	23%
Share on sewerage revenues (%)	28%	43%	64%

- b. Reduction of Funds Transferred from the SES. In case the State Government is not able to maintain the agreed levels of funding to CESAN as a result of deterioration of its fiscal capabilities, the company's finances will also be negatively affected. If there are no transfers from the Government and the PSP for sewerage in the Municipality of Serra is awarded, net losses will occur during the whole period and reaching 11 percent of revenues by 2020. Additional loans needed for CESAN will increase to 91 percent of investments and its capital structure will change significantly to 70 percent debt and 30 percent equity.

If there are no transfers from the Government and the concession is not awarded, the financial situation will deteriorate albeit at a slower pace. New loans will be needed to finance 68 percent of investment, and the company's capital structure will be 50 percent debt and 50 percent equity. In both cases, there will be a need to prepare a comprehensive financial strategy to guarantee CESAN's financial viability involving the State Government, Regulator, the company itself and customers.

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Map (IBRD 39815)

