



# Water and Landscape Integrated Management Program

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Environmental and Social Assessment Report -  
RAAS and Framework for the Program's  
Environmental and Social Management

## **EXECUTIVE SUMMARY**

Version September, 2013

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## 1. INTRODUCTION

The Water and Landscape Integrated Management Program<sup>1</sup>, under coordination of the State Special Project and Metropolitan Articulation Extraordinary Secretariat (Secretaria de Estado Extraordinária de Projetos Especiais e Articulação Metropolitana – SEPAM) and Fund-Raising Sub-secretariat (Subsecretaria de Captação de Recursos), proposes a US\$ 323 million investment. Has the objective of applying the resources of the municipalities that integrate the micro regions of the Caparaó, and the hydrographic basins of the Jucu and Santa Maria rivers, which contemplate the main cities of the metropolitan region of Grande Vitória.

It's about the resources involving actions in the urban and rural regions, destined to State's priority regions, aiming, within other targets the ones of:

- Guaranteeing that the access to water is assured, in the sense of being available in adequate quantity and quality for it's respective uses, as well as safeguarded for use of future generations;
- Increase the coverage of the collection, treatment and final destination of the sanitary sewage in the municipalities within the Jucu and Santa Maria da Vitória basin and, in municipalities where CESAN acts within the micro region of the Caparaó;
- Increase the State's forestry coverage, in the micro region of the Carapaó and proximities and the municipalities of the Jucu and Santa Maria da Vitória Basin;
- Institutionalize and promote good agricultural practices and the construction of back roads to contribute to the reduction of the contributors of water bodies siltation and pollution.

For the attainment of these objectives the Integrated Management Program is formed by 5 components, as follows:

Component	Investment Value US\$ million
<b>A. Integrated Water Management.</b> A.1 State Water Resources Plan A.2 Basin framing Plan A.3 Estruturação da Rede de Monitoramento Hidrológico A.4 Coast line Management A.5 Underground Water Wells Registry A.6 RMGV Integrated Urban Water Management A.7 Environmental and Water Resources Management Strengthening A.8 COMDEVIT Strengthening A.9 Program Strengthening, Monitoring and Assessment Technical Assistance and Support.	<b>76.8</b>
<b>B. Risk Management and Disaster Prevention</b>	<b>31.7</b>
<b>c. Springs Management and Forestry Coverage Recovery</b> C.1 Reforestation C.2 Mangaraí Demonstrative Unit	<b>35.0</b>
<b>D. ENVIRONMENTAL SANITATION</b>	<b>158.8</b>
<b>E. PROGRAM MANAGEMENT AND SUPERVISION</b>	<b>20.8</b>
<b>TOTAL</b>	<b>323.1</b>

The areas compromised by the program are presented in figure 1-1 below, represented by: (i) Jucu and Santa Maria da Vitória rivers basin, contemplating RMGV; and, (ii) by the Caparaó region.

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<sup>1</sup> Programa de Gestão Integrada das Águas e da Paisagem

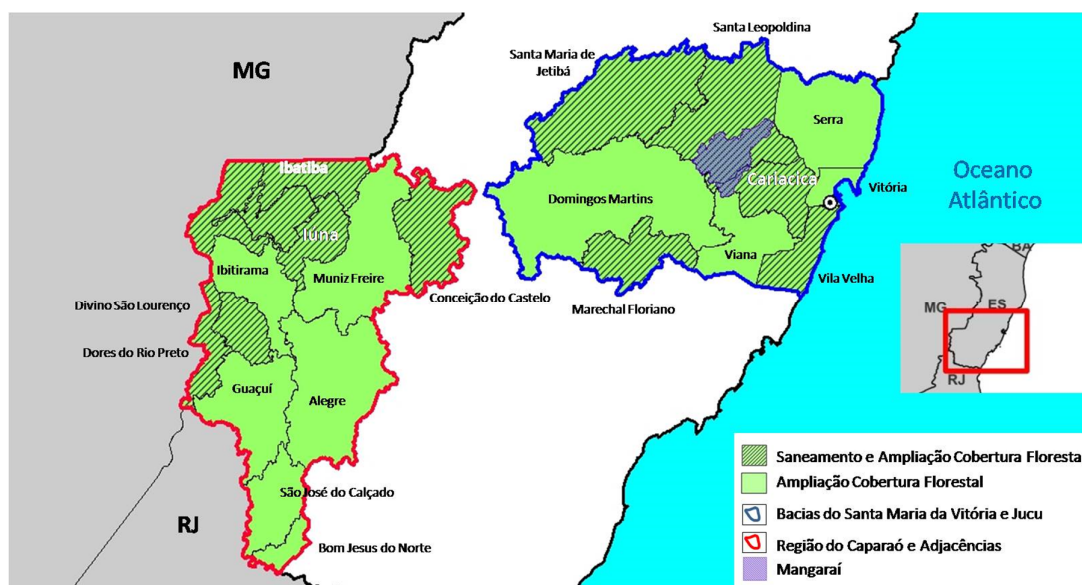


Figure1-1 - Program Action Regions and Basins

## 2. COMPONENT DESCRIPTION

### ■ Component A. Integrated Water Management

In this component are concentrated studies and plans necessary to instrument the water resources management by the State government of the metropolitan region of Vitória (RMGV), of responsibility of the State environment and water resources institute - IEMA, notably:

- ✓ State water resources plan,
- ✓ Classification of basin use classification,
- ✓ Metropolitan Urban Drainage Master Plan,
- ✓ Coast line management,
- ✓ Underground well registry,
- ✓ Espírito Santo's Hydrological Monitoring System Structuring

### ■ Component B. Risk Management and Disaster Prevention

In this component will be structured tools from the elaboration of the State risk and disaster management policy (B.1), focused for the risk management, specially through the identification and monitoring (B.2) and the construction of warning systems and preparation for disasters (B.3).

### ■ Component C. Springs Management and Forestry Coverage Recovery

The quest for the reduction of the sedimentation and the contamination of rivers and consequently the increase of the water quantity and quality in the springs is this component's main objective. The strategy is to integrate and recuperate forests associated to the decrease of erosion and production of sediments that reduce the rivers channels, increase the level of the groundwater and contribute to the reduction of the quantity and quality of the spring's waters. It is divided in 2 subcomponents: C.1 Reforestation, C.2 Mangaraí demonstrative unit.

**C.1 Reforestation** – This subcomponent seeks together with the small and medium rural producer, the stimulation of environmentally correct practices through conservation and forestry recovery actions, besides promote the adequate soil use.

**C.2 Mangaraí Demonstrative Unit** – This territory will receive actions related to forest recovery, good agricultural practices, sanitation, adequate waste disposal and recovery and conservation of rural roads. The Mangaraí demonstrative unit contemplates the territory limited by the Mangaraí river sub-basin, with the pilot project in natural scale, which will serve as reference for other sub-basins of the Jucu and Santa Maria rivers, main springs of the RMGV.

## COMPONENT D - Environmental Sanitation

The component concentrates the program's constructions, the higher volume of resources applicable. The following sewerage constructions are involved subcomponent D.1.

**Table 2.1 Sewerage intervention**

Region	Municipality	Sewerage System	Current coverage (%)	Project coverage (%)	Population that will be benefited
Caparaó	Dores do Rio Preto	Implantation	0	100	2,154
	Divino São Lourenço	Implantation	0	100	2,120
	Irupi	Rehabilitation and expansion	13	100	4,476
	Iúna	Rehabilitation and expansion	7	100	13,658
	Ibatiba	Rehabilitation and expansion	0	100	13,378
	Conceição do Castelo	Rehabilitation and expansion	8	100	5,898
Santa Maria	Santa Maria do Jetibá	Rehabilitation and expansion	59	100	9,684
	Santa Leopoldina	Rehabilitation and expansion	40	100	2,165
Jucu	Marechal Floriano	Implantation	0	100	6,499
RMGV	Cariacica	Bandeirantes System expansion	52	68	31,100
		Nova Rosa da Penha System expansion	1.4	100	5,173
	Vila Velha	Araçás System expansion	51.8	66	29,872
		Ulisses Guimarães (T. Vermelha) System expansion	11	100	41,915

The Sewage System Social Environmental Access Plan (Plano Socioambiental de Adesão aos Sistemas de Esgoto (D.2)) integrates this component, continuing the process implanted since the Clean Water Program (Programa Águas Limpas), of the communities' awareness and motivation in parallel to the execution of constructions, which, contemplate the inter residence connections.

The last subcomponent refers to the Sanitation Sector Strengthening (Fortalecimento do Setor de Saneamento (D.3)), applicable to CESAN, more specifically to the control losses of the water supply system.

## **Component E – PROGRAM MANAGEMENT AND SUPERVISION**

Understands the technical and administrative support necessary for the General Coordination and Management units and the Program's Executive Secretariat, acting with specialized consulting, when necessary. Support of a company specialized in project management is predicted to attend the quality and readiness to the executive demands, including in the supervision and inspections of the constructions.

### **3. GENERAL INTERVENTION AREAS CHARACTERISTICS**

The occupation of the Espírito Santo territory historically happens in a predatory way, with indiscriminate deforestation of areas, without a correct soil use, occupation planning and without the use of conservationist practices. This culminated with the degradation of these resources, causing a series of environmental, social and economic consequences to the rural producer, the public sector and all the Espírito Santo society.

Associated to this framework, there was a great growth, which continues, in the occupation of the coast, with the setting of big ports, to outflow minerals and the petroleum activities, besides the increase agglomeration of the Grande Vitória region – RMGV, compromised by seven municipalities<sup>2</sup>.

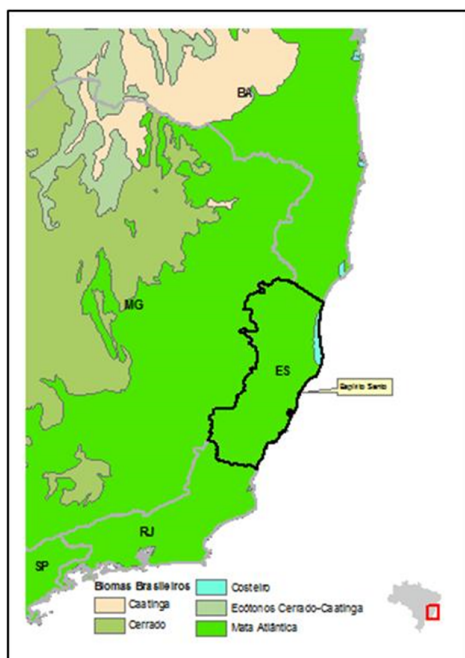
The RMGV's quick and constant population and industrial growth, main water suppliers of the region. It's predicted that in one decade it will be necessary the implantation of dams to regulate the capture of distant springs. On the other hand, there were situations in which CESAN's water capture and treatment system had to shut down in the Santa Maria da Vitória River, due to the quantity of particles present in the water, above the system's maximum limits of operation.

The region's predominant vegetation is originally contained in the Atlantic Forest biome, and, as can be seen in the following figures, few of this biome's original vegetation coverage are left. Today, in around 30% of the State's area can be found some vegetation suffering pressure of agriculture and livestock expansion.

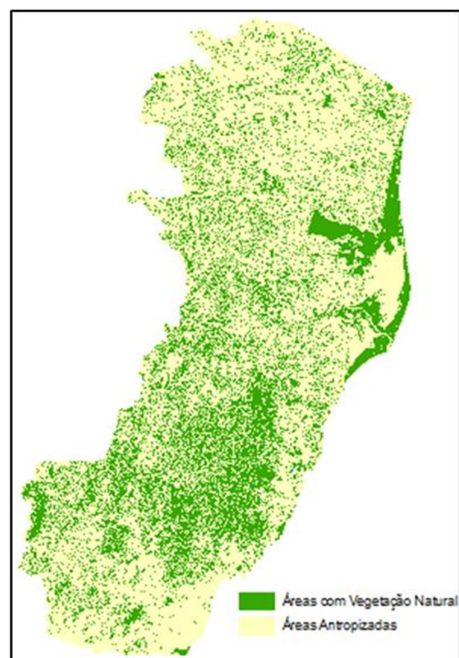
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<sup>2</sup> Municipalities that compromise the RMGV: Cariacica, Guarapari, Serra, Viana, Fundão, Vila Velha, Vitória.





**Figure3-1 – Brazilian Biomes**



**Figure3-2 – Vegetation Areas within Espírito Santo**

The program acts on the Santa Maria da Vitória, Jucu and Caparaó basins, the two first are important RMGV supply springs.

### **Santa Maria da Vitória and Jucu River basins**

The Santa Maria da Vitória River basin, with the exception of the RMGV stretch, presents low population density. Presents typical agricultural activities in the basin's middle and superior stretch, where the main cities are Santa Maria de Jetibá, located upstream from Rio Bonito and Suiça small hydro power plants, and Santa Leopoldina, located downstream.

In the RMGV, the basin presents municipalities with high population concentration and productive segments, namely: Serra, Cariacica. Vitória, State capital, is also part of the basin.

The Santa Maria basin, which before colonization was almost completely covered by Atlantic Forest, suffered great deforestation. The municipalities of Santa Maria de Jetibá and Santa Leopoldina, where the superior and middle stretches of the Santa Maria da Vitória are located, currently present 26.1% to 27.6% of their territories covered by Atlantic Forest. The region's remaining forests are located in places of hard access, generally hill tops. A great part of the basin is currently covered by pastures and crops and basin's communities generally launch untreated sewage in rivers and streams.

In the Jucu river basin, what is observed in the middle and superior stretches are the agriculture uses, while the main urban concentration is located in the cities of Domingos Martins and Marechal Floriano. The region's industrial pole resumes itself to beverages, dairy, animal ration, and midsize food industries, while the sewage is launched in water bodies, normally untreated. The lower course of the Jucu River is very modified compared to what it was originally, presenting series of artificial draining canals to help the water flow. With the ratification and the dredging, the river's capacity to carry sediments increased, which allied to the extraction and exploration of sand pit, leads to the siltation and great changes to the pluvial regime close to the river mouth.

Similarly, the Jucu river basin covers the RMGV, part of Guarapari and Cariacica and the municipalities of Vila Velha and Viana.

In both basins, factors of water degradation like: launch of untreated sewage, industrial effluents, mining residues, important erosive processes on the riversides, agriculture effluents and residues and the presence of dams and lakes.

### **Itabapoana and Itapemirim river basins – Caparaó region**

The River basin of the Itabapoara and Itapemirim rivers involve the Caparaó region, intervention region to the west of the State. With a hilly landscape, involves the Serra do Caparaó region and its national park. The soil present in the basin offer a series of use restrictions, including mechanization, because it's susceptible to erosion and has low natural fertility; it basically limits itself to pastures and coffee plantation, recently the search for touristic activities has grown, altering the traditional routine and interfering with the remaining natural resources.

This basin's forest resources exhaustion is attributed the coffee plantation and the crop/pasture activities without previous agricultural assessment studies, which facilitated the soil erosion. One of the main causes of the basin's water quality degradation is the launching of untreated urban sewage.

The main environmental impacts observed in the basin, are: organic water pollution, microbiologic contamination, siltation of the channel and turbidity increase, riparian vegetation reduction, presence of garbage in the water or in the sediments, and floods.

### **Conservation Unit**

There were 12 conservation units accounted in the Jucu and Santa Maria regions study area and 9 UC in the Caparaó region (being 8 RPPNs). The conservation units will not be directly reached by the activities pretended by the program.

### **Historical and Cultural Patrimony**

With the exception of the municipalities of the Caparaó region, the municipalities of the Jucu and Santa Maria da Vitória basins and the RMGV present, generally, protected historical goods and archeological sites. It was accounted 5 protected Real Estate, with 3 in Vila Velha and 2 in Santa Leopoldina. Also 5 archeological sites in Cariacica, 1 in Santa Leopoldina and 1 in Vila Velha are registered, totalizing 7 archeological sites.

### **Indigenous Population**

In the programs coverage area there are no indigenous land nor in Jucu and Santa Maria da Vitória basin nor in the Caparaó region.

## **3.1 MAIN ENVIRONMENTAL ISSUES**

### **LACK OF SANITATION – SEWERAGE**

One of the main cause s of water quality degradation in the programs coverage area is the launch of untreated urban sewerage.

The following table presents the sanitation coverage percentage (water supply and sewerage) of the population coverage by the program.

**Table 3.1 - Municipality Sanitation Coverage Situation**

Basin	Municipality or System	Current Urban Population	Water Supply (%)	Sewerage Collection (%)	Sewerage Treatment (%)
Sta Maria da Vitória	Santa Leopoldina	2,634	100	40	0
	Santa Maria de Jetibá	8,628	100	50	46
	Vila Velha (Terra Vermelha System)	41,915 <sup>(1)</sup>	100	11	11
	Vila Velha (Araças system)	29,872 <sup>(1)</sup>		51	51
	Cariacica (Bandeirante system)	31,100 <sup>(1)</sup>	100	52	52
Jucu	Cariacica (Nova Rosa da Penha system)	5,173 <sup>(1)</sup>		2	2
	Marechal Floriano	7,408	100	62 <sup>(2)</sup>	0
Itapemirim (Caparaó)	Ibatiba	13,358	100	0	0
	Iúna	15,640	100	10	0
	Irupi	4,440	100	36,5	30
	Conceição do Castelo	4,946	100	15	10
Itabapoana (Caparaó)	Divino de São Lourenço	1,742	100	0	0
	Dores do Rio Preto	3,542	100	20	0

Source: CESAN, IBGE

(1) Project Population (2) – installed sewerages but not operating

If on one hand it can be seen the universalization of the water supply system of the cities above, on the other it can be observed that a large part of the sewerage produced in the municipalities participants of the program is not collected, being launched directly in street gutters or directly in the streams that flow through the city. Even when collected, part is being launched, untreated, in close water bodies, increasing even more the pollution levels and public health risks.

In the municipalities of the study area that integrate the RMGV, case of Cariacica and Vila Velha, it is verified that besides the advances in the increase of the sewerage system in the last decade, there is still a large part of the population which is no attended.

CESAN's challenge is to promote the sewerage attending in the cities of the Caparaó region and at the high part of the Santa Maria da Vitória and Jucu river basin, reflecting in the increase of the RMGV public supply springs water quality, and promote expansion of the sewerage systems in the cities of Cariacica and Vila Velha in the RMGV.

### **The issue of Vegetation Coverage of the Area Covered by the Program**

The Caparaó region, with municipalities with vast rural areas, generally presents itself with low levels of forest coverage. In the Jucu and Santa Maria da Vitória river can still be seen, in the headwaters region, high percentages of forest coverage being that in the municipalities located at the mid and low parts, can be seen a higher incidence of deforested areas.

It is worth mentioning that the Jucu and Santa Maria da Vitória basins are responsible for the water supply of around 60% of the State's population, located in the municipalities of

the RMGV. Therefore, the State government is testing different ways of stimulating the conservation and recovery of the forest coverage in these areas, as well as the sustainable practices of land use. A highlight is the project "Florestas para a Vida" that with donation of resources from the GEF and have the World Bank as the implementing agent, developed a methodology of applying the payment for environmental services (Pagamento por Serviços Ambientais – PSA) for the municipalities located in the headwaters of the Jucu and Santa Maria da Vitória basins.

Based on the accumulated expertise in these actions and in other projects focused on forest recovery actions, the State government created the Espírito Santo Forest Coverage Expansion Program, denominated Programa Reflorestar. The program's main strategy is the integration of existing projects and actions that are aligned with its objectives, to enable the rural producers a vast package of stimulation for the maintenance and implantation/implementation of sustainable practices of soil use in their properties.

The Reforestation Program foresees the increase in 30,000 hectares of the Espírito Santo State's forest coverage, for the period from 2012 to 2014. For the Caparaó region and the Jucu and Santa Maria da Vitória basins are forecasted the fulfillment of 27 % of the Reforestation target or around 8.3 thousand hectares, distributed among the 21 municipalities in the region.

### **The Soil and Water Use in the Jucu and Santa Maria Basin and its Impacts over the Water Quality for RMGV Supply**

The occupation of the study area process historically occurred in a predatory manner, especially with the agricultural activities. These activities are more intense in practically all the territories of the Jucu and Santa Maria da Vitória river basins, in the west half particularly, and through all the extension of the Caparaó region. Against the conditions offered by the environment, the rural producers, altogether, have advanced on to land necessary for the preservation of the environment and water quality.

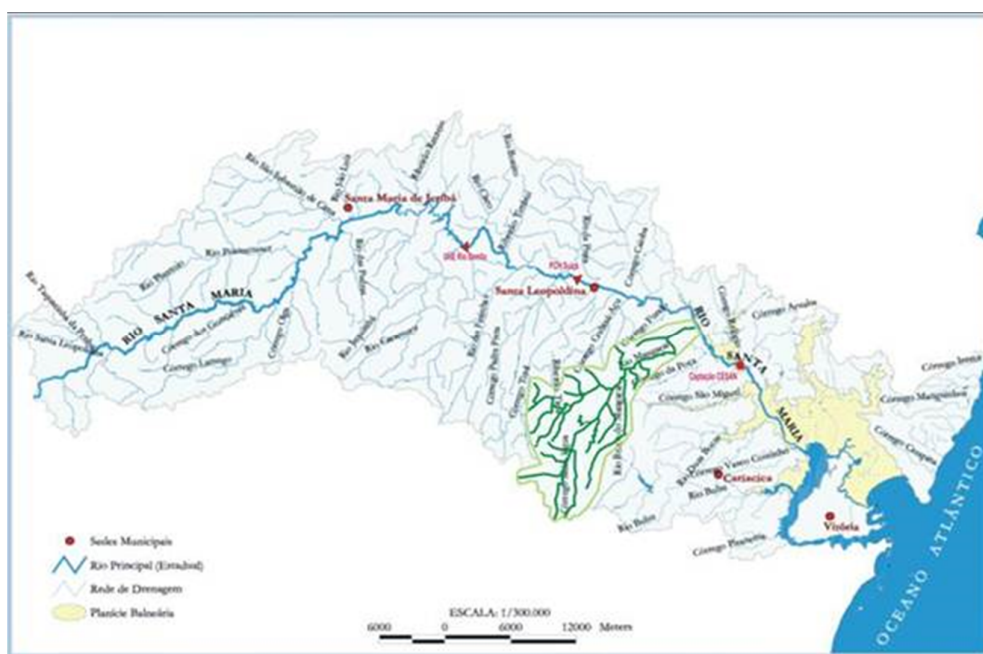
Besides agriculture, the inadequate maintenance of roads and the non-adoption of good practices in the implantation of access to rural areas, also has contributed greatly in the carrying of material to the rivers. The advance of agriculture on to permanent preservation areas (Áreas de Preservação Permanente - APP) – river slopes and riversides trough out time contributed to the accelerated river siltation process and carriage of particles.

In the Santa Maria da Vitória basin case, one of the main RMGV supply springs, it has been noticed a reasonable increase of the quantity of sediments carried in the last years. Reason of concern of the two water treatment units (Estações de Tratamento de Água (ETA)) that receive the water captured from the Santa Maria da Vitória river: ETA Santa Maria and ETA Carapina. Recently, in December 2010, due to a period of strong rains, the turbidity index of Santa Maria da Vitória gross water caused the stop of the water supply system that includes the continental part of Vitória, the whole municipalities of Serra and Fundão. This situation has been frequently happening.

In the basin's medium-high part, there are also 2 small hydro power plants: Rio Bonito and Suíça which have been operating for more than 20 years. These small hydro power plants reservoirs operations highly influence the water regime of the downstream stretches, especially in dry periods. Additionally, these power plants must periodically use the dams bottom outlet to clean the reservoirs, being able to influence the solid levels in the downstream stretches during these operations.

Considering the importance of this spring for RMGV's water supply and the possibility of future water capture (the granted permit is of 3,800 l/s once CESAN currently captures a medium flow of 2,700 l/s), CESAN seeks an alternative which enables an inversion of the current water capture logic every time further with more sophisticated and with costly operational processes.

This inversion is based on the search of preservation and recovery of the of the main spring's basins - Jucu and Santa Maria da Vitória, through forest recovery actions (through the Reflorestar project), adequacy and recovery of back roads, good agricultural practices incentives, rural sanitation and proper residue destination. The logic is to transform the springs in the first stage of the water treatment and, in medium and long term transform the basins in natural water treatment units.



**Figure3-3 – Mangaraí Sub-basin**

In this sense, initially seeks the implementation of recovery actions in a natural pilot area of which results can posteriorly orient the methodology's application in other regions of the Santa Maria da Vitória and Jucu basins, Thereby a sub-basin of the Mangaraí river was selected, located at the Santa Maria river basin in the downstream stretch of the main municipalities and the existing PCHs upstream from CESAN's capture location.

### **RMGV Flooding Issue**

The metropolitan region of Grande Vitória – RMG, occupies, in great part, low areas of Jucu and Santa Maria da Vitória basins, originally constituted by marsh, strongly influenced by the tide, and that within the years being occupied by real estate enterprises and recently by the petroleum and natural gas sector.

The growth of this urban area caused pressure over the urban infrastructure, especially on the road system, sanitation and pluvial draining systems. The events of floods in urban areas, particularly in the municipalities of Vila Velha, Cariacica and Viana, it is a reoccurring fact that has been practically incorporated to the local population's every day. The document Atlas of the Espírito Santo State Potential Risk Areas (ARES - *Atlas das Áreas Com*

*Potencial de Riscos do Estado do Espírito Santo*) identifies the RMGV as a very high flood risk area.

The State and municipal governments have been implementing a series of macro draining interventions in the region, trying to minimize problems verified. However, the region lacks an integrated and omnibus vision over the soil use and occupation, on the occurrence of critical events and regions macro drainage, not only on the structural aspects but mainly on the non-structural related to the pluvial water management integrated to other urban policies (soil use and occupation, public cleaning, sanitation, road system, etc.), institutionally articulated within many players and compatible with the environmental conservation lines.

In this sense, the State wants to develop a Metropolitan Drainage Master Plan (Plano Diretor Metropolitano de Drenagem Urbana), with the objective of adopting a dredging Master Plan for the RMGV, with management, action planning and investment instruments to minimize the effects of floods and qualify the urban space. Besides, organize the metropolitan institutional structure and discipline the public managers to face the problems, which are inter municipal.

### **Environmental Institutional Capacity**

**SEAMA-IEMA System** - Regarding the State institutional system for the environmental and water resources management (SEAMA-IEMA system), in the last 5 years great increment of human resources, implantation of management and monitoring instruments, especially because of the Clean Water Project financing. Highlight, among others, in the water resources area: institution of permit for the water resources use; incentive for the creation of basin's committees; development of a water user registry and improvement water resource use permit system. In the environmental licensing can be seen a sensible upgrade in the management capacity with a reduction in the liabilities and the license concession period; institution of Consulting registry and simplified license; standardization of the internal licensing procedures; effectiveness of the technical framework with the team capacitation process.

Besides the favorable institutional framework, the IEMA still lacks important environmental and water resources management instruments.

**CESAN**- In relation to CESAN can be seen an evolution of the companies environmental management, occurred in the last years, exclusively with the support of the World Bank's Clean Water Project. Besides the strengthening of the companies' environmental management area: highlight: (i) implementation of the environmental management system, based on the ISO 14000, in two facilities – WTP Caçaroca (3971/s capacity) and STP Praia do Morro – Aeroporto; accreditation stage; (ii) Agricultural and forestry use and management of the STP's sludge in Espírito Santo project, among others. CESAN also incorporated the construction conception and execution environmental criteria and procedures in consonance with environmental and social safeguards. Highlights, exclusively, the implementation of Environmental Construction Manual – which the company now requires in all its construction contracts.

CESAN still presents shortage in the environmental management related to water and receiving bodies' quality monitoring regarding the disposition of the STP's effluent and other impacts generated in the hydro corps.

#### 4. PROGAM ENVIRONMENTAL ACTION STRATEGY

The Water and Landscape Integrated Management Program has among its objectives the reversal of the environmental and water resources degradation scenario of the Caparaó region and the Santa Maria da Vitória and Jucu river basins, important springs for the metropolitan region of Grande Vitória – RMGV water supply.

The programs actions, at the same time that it seeks improve the population's life condition increasing the economical and urban infrastructure; it also seeks a harmony with the sustainable use of its natural resources.

The following table presents a correlation between the verified environmental problems in these regions and main actions of the Water and Landscape Integrated Management Program to face and reverse the environmental degradation scenario.

**Table 4.1 Main Environmental Issues x Program's Main Actions**

<b>BASIN'S MAIN ENVIRONMENTAL ISSUES (LIABILITIES)</b>	<b>PROGRAM'S MAIN ACTIONS Components</b>
Lack of sanitation infrastructure – sanitation collection and treatment systems in the municipal headquarters with reflections in a growing scenario of <i>water resources</i> degradation.	Implantation, rehabilitation and increase of sanitation systems in the main municipalities of the region (component D). Structural and sanitation infrastructure operational and efficiency improvement (component D)
Reduction of environmental services related to water and soil protection against forest coverage reduction and the soil use of inadequate practices in the region.	Conservation and reforestation actions in the Caparaó region and the Santa Maria and Jucu river basins – (component C – subcomponent C1 reforestation).
Significant changes in the Jucu and Santa Maria da Vitória rivers water quality, specially related to the increase of sediments with consequences to the RMGV water treatment units.	Adoption of a pilot project in natural scale with forest recovery, adequate and recovery of back roads, good agriculture practices incentive, rural sanitation, etc. (component C – subcomponent C.1 Reforestation and subcomponent C.2 Mangaraí Demonstrative Unit).
Critical scenario of frequent floods in RMGV's municipalities.	Elaboration of a RMGV Macro drainage Master Plan, elaboration of studies and basic and executive projects, at least of two areas of the PMDU Letter of Priority (Carta de Prioridade do PMDU) – Subcomponent A.7
Necessity of strengthening the environmental and hydro resources management.	Institutional IEMA and environmental and water resources management strengthening (Component 1)

#### 5. LEGAL AND INSTITUTIONAL FRAMEWORK

For the effects of the foreseen intervention in the Water and Landscape Integrated Management Program framework, the main normative matters are related to the environmental licensing for the execution of constructions and/or physical interventions and to authorizations related to the launch of untreated effluents in receptive water bodies.

The environmental licensing and permit of the right of water use are IEMA's responsibilities and the program's intervention will be submitted to the licensing according to law.

Most interventions are small, being that those referred to component C, because they are related to forest recovery interventions, recovery of back roads, simplified water supply and sanitation basically depend on environmental authorizations.

In relation to **component D – ENVIRONMENTAL SANITATION**, the CONAMA resolution (Conselho Nacional de Meio Ambiente) 377/2006 establishes classification criteria of sanitation enterprise sizes and defines special environmental licensing procedures for small and midsize enterprises.

Based on CONAMA resolution 377/2006, the State Environmental and Water Resources Institute (Instituto Estadual de Meio Ambiente e Recursos Hídricos – IEMA), from the Espírito Santo State, edited the normative instruction N° 12/2008, that displaces about the enterprise classification and definition of the simplified environmental related procedures.

The IN 12/2008 establishes the following criteria for the sanitation systems:

Sewerage system facility type	Small sized
Elevator units, collector trunks or sewerage discharge tubes.	Output higher than 200 l/s and inferior or equal to 1,000 l/s
Sewage treatment plant (without the use of stabilization lagoons)	Output (*) inferior or equal to 50 l/s

(\*) for sewage transport systems (Elevator units, collector trunks or sewerage discharge tubes) with output inferior to 200 l/s will be issued a licensing exception declaration (Declaração de Dispensa de Licenciamento).

The systems that classify in the table above as small size shall have simplified environmental licensing procedures, with the issuance of a simplified license (Licença Simplificada – LS) which substitutes the previous and installation licenses.

For the case of sanitation systems that don't classify as small size, the environmental licensing shall follow standard procedures with (i) previous license (Licença Prévia – LP); (ii) installation license (Licença de Instalação – LI), and (iii) operation license (Licença de Operação – LO). For these enterprises, the environmental studies required are **simplified studies without the requirement of the EIA/RIMA**.

### **Analysis of the Systems Proposed for World Bank Financing**

According to size criteria established by the resolution 377 and the IN 12/2008, almost all systems predicted in the Project classify in the "small size" category and that must have a simplified licensing process with only one license. The only exceptions refer to the Bandeirantes system expansion enterprise, in Cariacica and Araçás and Ulysses Guimarães (Terra Vermelha) system expansions, in the municipality of Vila Velha, that classify as midsize.



**Table 5.1 Proposed system sizes (for environmental licensing proposes -IN12/2008)**

System/City		Population (Hab.)	STP Current capacity (l/s)	STP final projected capacity (l/s)	Size Conama 377/2006	Size IN 12/2008
Cariacica	SES Bandeirantes expansion	31,100	250	250	Midsize	Midsize
	SES Rosa da Penha expansion	5,173	48	48	Small	Midsize
Vila Velha	SES Araçás expansion	29,872	400	650	Midsize	Midsize
	Terra Vermelha	41,915	30	150	Midsize	Midsize
Santa Leopoldina		2,165	6 <sup>(2)</sup>	6	Small	Small
Santa Maria do Jetibá		9,684	27.3	27.3	Small	Small
Marechal Floriano		6,499	0	12.6	Small	Small
Dores do Rio Preto		2,154	0	6	Small	Small
Divino São Lourenço		2,120	0	5	Small	Small
Irupi		4,476	0 <sup>(3)</sup>	12	Small	Small
Iúna		13,658	20.5 <sup>(2)</sup>	32.5	Small	Small
Itatiba		13,378	7.5 <sup>(2)</sup>	32.5	Small	Small
Conceição do Castelo		5,989	0 <sup>(3)</sup>	11	Small	Small

According to what is seen in the sanitation system environmental licensing criteria and procedures established by the national and State environmental law, the systems proposed by the Water and Landscape Integrated Management Project – Espírito Santo State:

- Small size, in majority with simplified environmental licensing;
- Midsize, the Cariacica and Vila Velha systems being that 2 subsystems refer to the expansion of existing systems. Even in this case of Ulysses Guimarães – Terra Vermelha, the environmental studies required by IEMA – state environmental agencies are simplified. For the midsize, it Worth mentioning that the existing STPs has available area to expand.

## **Outorga**

The State water resources council (CERH – Conselho Estadual de Recursos Hídricos) considered that “the public sanitation service involves the depolluting activities, that objectives the promotion of public health and population life quality improvements, demanding different rules that incentive the universalization of services”. With this concept, treats the launch of treated sewerage as a depolluting activity and supplies the permit in harmony with the licensing deadlines to continue constructions.

## **6. ENVIRONMENTAL AND SOCIAL ASSESSMENT**

The evaluation of the Water and Landscape Integrated Management Program's components was elaborated considering, simultaneously, the (i) attending of environmental requirements within the World Bank's safeguard policies, as the condition to sign the Loan Agreement; and (ii) the strict compliance and attention to the federal, state and municipal legal provisions, in particular reference to the environmental licensing norms and procedures of the actions predicted in the Project.

According to the understandings kept with the World Bank in the present Project preparation stage, the infrastructure interventions find themselves aggregates in two groups: (i) the first referred to sanitation interventions – sewerage that possess a details to

the level of structured projects and; (ii) the second referred to the components that find themselves in conception stage and depending of detail to the level of basic or technical projects that shall happen in the beginning of the program.

Additionally, the program foresees technical assistance actions for plans, studies and Project preparation. Considering that some of these plans, studies and projects can define and select infrastructure interventions that can, in the posterior and future implementation stage cause environmental and social impacts, the document predicts the incorporation of instruments that contemplate social environmental aspects predicted in the current law and the World Bank's safeguards.

In this sense, the environmental and social assessment presents approach with two focuses:

- Detailed environmental and social assessment – To the components and subcomponents which interventions already count with developed projects, the report does a detailed environmental and social assessment considering national and state environmental criteria and procedures and the World Bank's environmental and social safeguards;
- Framework for the programs environmental and social management, where the components environmental and social viability that still depend a details from the projects action and development, and constitutes itself of reference documents to consider environmental and social actions regarding the implantation of the Water and Landscape Integrated Management Program. The same defines procedures and methodologies to guide assessments and studies that will be conducted during the project's implantation, as well as the environmental aspects associated to the execution, operation and maintenance of the selected actions.

In the World Bank's safeguard policies framework, there is orientation so that the negative environmental and social impacts are identified, avoided, diminished, mitigated and monitored, and the positive impacts potentiated. For the program, classified – according to the safeguards policy – case of Project category "B" the following World Bank's safeguard are applied:

- ✓ OP 4.01 Environmental assessment
- ✓ OP 4.04 Natural habitat
- ✓ OP 4.09 Pest Management
- ✓ OP 4.11 Physical-cultural resources
- ✓ OP 4.12 Involuntary resettlement
- ✓ OP 4.36 Forests

The others safeguard policies (OP 4.20 Indigenous population; OP 7.50 Projects on international waterways; and OP 7.60 Projects in litigation areas) do not fit in the components nor in the Project development scope.

## **6.1 Environmental assessment of the first year projects - already detailed**

In the Water and Landscape Integrated Management Program preparation frame, were identified the interventions that had a structure basic Project so they could be implanted at the start of the financing contract.

According to described in chapter 2 these interventions refer to the rehabilitation and expansion and/or implantation of sanitation systems which Project were developed by CESAN and comprehend the municipalities indicated below:

**Table 6.1: Sewerage Systems with defined Projects**

<b>Region</b>	<b>Municipality</b>	<b>Type of intervention</b>
<b>Caparaó</b>	<b>Dores do Rio Preto</b>	Sewerage system <b>implantation</b>
	<b>Divino São Lourenço</b>	Sewerage system <b>implantation</b>
	<b>Irupi</b>	<b>Rehabilitation and expansion</b> of the sewerage system.
	<b>Iúna</b>	<b>Rehabilitation and expansion</b> of the sewerage system.
	<b>Ibatiba</b>	<b>Rehabilitation and expansion</b> of the sewerage system.
	<b>Conceição do Castelo</b>	<b>Rehabilitation and expansion</b> of the sewerage system.
<b>Bacia do rio Santa Maria</b>	<b>Santa Maria do Jetibá</b>	<b>Rehabilitation and expansion</b> of the sewerage system.
	<b>Santa Leopoldina</b>	<b>Rehabilitation and expansion</b> of the sewerage system.

To do the environmental and social assessment of these interventions the following procedures were adopted:

- (a) Technical documentation consultation – basic projects of the proposed intervention;
- (b) Environmental documentation consultation of the proposed interventions: environmental licenses, environmental authorizations and launching permits issued by IEMA;
- (c) Technical meetings with CESAN's team responsible for the projects;
- (d) Technical field inspections of the interventions/projects areas.

#### **6.1.1 SPECIFIC ENVIRONMENTAL ANALYSIS**

Considering that it regards small size systems, of which impacts during construction can be managed with the adoption of adequate engineering practices, specific environmental and social assessment for each system had a main focus: (i) in the STP's location and possible impacts over the surrounding; and (ii) the impact of the sanitation system over the receiving body.

##### **Existing systems**

The municipalities of Iúna, Ibatiba and Santa Leopoldina have STPs, constituted by anaerobic fluidized-bed reactor – UASB followed by a aerated Bio filter, implanted by the city halls with resources coming from the National Health Foundation (Fundação Nacional da Saúde (FUNASA)), about 10 years ago, and never where operated due to the fact of the non-implantation of the sewerage collection and transport systems.

The municipality of Irupi has about 30% of collection coverage and with a non-operating STP (sistema de fossa and filter).

The other municipalities do not possess any sanitation system.

### ***Impacts over the receiving body***

The systems projected, once predicted STPs (UASB = aerated Bio filter) with the removal capacity of 85-90% of the organic matter – BOD (Biochemical Oxygen Demand), will bring significant positive impacts to the receiving bodies making possible class 2 rivers BOD and DO (Dissolved Oxygen) levels.

### ***STPs locations***

There are 3 STP location situations in relation to urban occupation:

- STPs located farther than 500 meters of the urban area, case of Dores do Rio Preto and Santa Leopoldina;
- STPs located between 200 and 500 meters of the urban area, case of Divino São Lourenço, Irupí, Iúna, Conceição do Castelo and Santa Maria do Jetibá;
- STPs located less than 200 meters of urban occupation – case of Ibatiba, with less than 100 meters.

The STP location further than 200 meters of urban occupation area significant reduces the possibility of negative impacts during the operation stage, such as odors, noise and etc.

In the case of Ibatiba, the STP is pre-existed and shall be recovered and expanded to receive the sewerage collection system that will be implanted.

The operational impacts aspects promoted by gas and sludge are treated as follows.

## **6.1.2 GENERAL SYSTEMS EVALUATION**

### **Engineering aspects**

The projects presented are in accordance with good engineering practices and shall reach the predicted performance in terms of effluent quality and sludge stabilization and already consider important environmental aspects for the location of the grids, Concepcion and location of the elevators, including the odor treatment.

The sewerage treatment facilities will use the up flow anaerobic reactors process followed by submerged aerated bio filters. This type of process achieves about 85-90% of BOD removal.

### **Constructive aspects**

The sewerage systems are small, the interventions are located in urban areas being that the collection and transport facilities will be implanted in asphalted roads, or not, the impacts related to its implantation are located, transitory and not very significant, occurred mainly from the inferences activities of construction.

These impacts can still be minimized with the adoption of adequate construction techniques and procedures. In the programs Environmental Management Plan (Plano de Gestão Ambiental – PGA) (chapter 8) contains the environmental construction manual, that shall be incorporated to the construction invitation to bid.

## **SLUDGE AND DEBRIS DISPOSAL**

CESAN normally disposes the RMGV sludge of the treatment facilities in licensed sanitary landfills. Regarding da the Clean Water Project (Projeto Águas Limpas), CESAN did in partnership with INCAPER, an important job related to the agriculture and treated sewerage sludge disposal, in various cultures. Is currently building the installations for the treatment of these sludge's (regional sludge management facility -Unidade Regional de

Gerenciamento de Lodo – URGL), to attend the CONAMA resolution 375/06 and 380/06 requests.

However, the existing concern with final disposal in the new systems of the interior, especially the ones of the Caparaó region, with significant distance from landfills located in RMGV and URGL to be created.

A study of technical and economical alternatives is recommended to guarantee the economical and safe sludge disposal. This alternative study contains the programs PGA and shall be elaborated in the first year of implantation of the program in time of its adequate implantation.

## **GASES**

The projects presented have burners for the gases generated by the UASB reactors. This alternative reduces the impact generated by gas emissions to the atmosphere.

The projects shall include gas line safety equipment, like purges and flame trap valves. These devices have to be adopted because of safety measures against the flame return and reactor explosion.

## **ODORS**

The main odor sources in the sewerage treatment facilities that use the process of a UASB reactor followed of an aerated bio filter are in the accumulation of debris from the preliminary treatment and the drying beds. The first can be mitigated with the higher frequency of debris removal and adequate temporary disposition in closed buckets.

The second has a more complex solution due to the facilities characteristics, which are normally open to allow the sludge drying. For the systems that the STPs are closer to urban occupation like Divino São Lourenço (200 meters), Irupi (300 meters) and Ibatiba (less than 100 meters), CESAN proposes a solution of covering the drying units with a mobile cover, that inhibits the free liberation of sludge odors, in the first days of the dehydration process, where occurs most of its draining and odor liberation, until the removal to final disposal. This cover was successfully implanted in the pilot facility in the Jucu basin. It is recommended that this solution should be adopted in the other systems that are located less than 500 meters from urban occupation, case of Conceição do Castelo.

Additionally, it's also recommended: (i) the adoption of a vegetation barrier around the STPs; and (ii) institutional support to the city hall with the objective of including the municipal legislation and master plans that guarantee of maintenance of the areas around the STPs like *non aedificandi*.

## **LAND ASPECTS**

The areas where the elevator facilities and STPs will be installed are areas currently unoccupied. Parts of these areas are public areas and other parts are private that find themselves in a cadaster process for the acquisition by CESAN.

### **6.1.3 ENVIRONEMNTAL LICENSING AND LAUNCHING PERMIT**

The proposed systems present the following situation regarding the environmental licensing and launching permit:

#### **Environmental licensing**

- The Dores do Rio Preto, Divino São Lourenço, Irupi, Iúna, Ibatiba, Conceição do Castelo and Santa Maria do Jetibá systems already have their respective

environmental licenses – simplified licenses issued by IEMA in 2012; and the Santa Leopoldina system, issued March 2013.

#### **Permit**

- The Ibatiba and Santa Maria do Jetibá already have their respective effluent launching permits issued by IEMA in 2012;
- The conception permit for the remaining systems finds themselves under IEMAs analysis.

#### **6.1.4 ASSESSMENT UNDER THE WORLD BANK'S ENVIRONMENTAL AND SOCIAL SAFEGUARDS**

By the enterprises characteristics (sewerage systems for the cities of Dores do Rio Preto, Divino São Lourenço, Iúna, Irupi, Ibatiba, Conceição do Castelo, Santa Maria do Jetibá and Santa Leopoldina) presented in the previous items, are analyzed the interferences with the World Bank's environmental and social safeguards: OP 4.01 – Environmental assessment; OP 4.12 – Families involuntary resettlement; and OP 4.11 – Physical-cultural resources.

##### **OP 4.01 – Environmental assessment**

The enterprises, with the exception of Santa Leopoldina, already have their respective environmental licenses – LS issued by IEMA-ES. Because of the size of the enterprises there it was not necessary specific environmental studies, being that the environmental assessment was done by the present document.

Regarding the effluent launching permit, they were already issued by IEMA for the Ibatiba and Santa Maria do Jetibá, while the others are in IEMA's analysis process.

The sewerage systems are small with small sized impacts, located, transient and of more significant character, mainly from the construction inherent activities. In that sense, it's predicted the adoption of an environmental construction manual, consisting from the bidding process that is found annexed to the present report.

Considering however, the possible impacts in the operation stage arising mainly from the sludge dehydration and final destination stage, the present assessment recommends: (i) the adoption of recovery of the drying beds for the Iúna and Conceição do Castelo STPs, besides the ones predicted for Ibatiba, Irupi, Divino São Lourenço and Dores do Rio Preto; (ii) the performance of a technical, environmental and economic alternatives studies for the final destination of the STPs sludge in the Caparaó region. This study, to be developed within the programs first year of implementation, shall contemplate an analysis of the following alternatives, among others: (a) use of RMGVs sanitary landfill; (b) implantation of a regional sludge management facility (Unidade Regional de Gestão de Lodos – UGL), with a view on the regions agricultural use; and (c) implantation of a specific sanitary landfill to receive the regions sludge's.

The implantation of the constructions shall count with an environmental construction supervision to be contracted according to the programs implementation.

##### **OP 4.04 – Natural habitats**

Most of the areas that will be used for the implantation of the enterprises are anthropic. The conception of the intervention locations seek to avoid the maximum incidence areas with natural vegetation and don't present interface with conservation units.

Some stretches of the system occur over permanent preservation areas (areas de preservação permanente – APPs). Considered by law as public utility intervention, this intervention has already been authorized by the environmental agency (integrates the simplified license) and minimized with adequate construction techniques and with posterior recovery of the intervention areas.

#### **OP 4.12 – Involuntary Resettlement and Real Estate Acquisition**

The systems implantation areas find themselves unoccupied. Part of the elevator facilities and STPs are in public areas and part in private areas.

CESAN developed an evacuation and acquisition plan (Expropriation and Real Estate Acquisition Plan), according to OP 4.12 procedures, for facilities of the sewerage system of the 8 municipalities. This plan comprehends the evacuation and acquisition of private real estate as well as the public areas assignment by the respective city halls and the emissaries' passage terms.

#### **OP 11.03 – Physical-cultural resources**

According to the constant research of the environmental and social assessment report (Relatório de Avaliação Ambiental e Social – RAAS) does not contain the existence of historical sites or archeological patrimony in the cities where the sewerage systems will be implemented, exception for the municipality of Santa Leopoldina, where are located the following protected goods.

<b>Municipality</b>	<b>Patrimony</b>	<b>Location</b>
Santa Leopoldina	Archeological	Santa Tereza Plant
	Real Estate	Colonial Museum – protected by the State Culture Council (Conselho Estadual de Cultura – CEC) on 02/08/83, process 08/80.
		Santa Leopoldina Historical Site - Protected CEC on 02/08/83, Process N° 08/80

The sewerage system proposed for Santa Leopoldina does not present interferences with these goods, but considering the existence of an archeological site in the region, specific procedures of “salvamento ao acaso” will be adopted during the construction stage of Santa Leopoldina system.

A recent World Bank report regarding the gender strengthening, (World Bank, Igualdade de Gênero e Desenvolvimento, Visão Geral, 2012) comments on the world salaries, education and health deficiencies and inequity between men and women. Highlights that the water supply and sanitation themes, improvements in the supply as those necessary to reduce excessive feminine mortality, among girls and mothers in the developing world, will require significant resources, but has been responsible for the improvement in women life expectancy through the reduction of the excessive child and reproductive age mortality.

Specific emphases of sanitation services gender is not presented in the report: “in the urban areas, generally there is a sufficient demand for improvement once the individuals and communities can capture the installation investments benefits. However, the solution is strengthening the rights of property and understands the informal settlements, stimulating the demand and, at the same time, secure that the communities have access to suppliers”.

### 6.1.5 GLOBAL SYSTEM'S ASSESSMENT - ALREADY DEFINED CONSTRUCTIONS

According to the assessment related to the sewerage systems presented in table 6.1,, the cities: (i) Caparaó region: Dorés do Rio Preto; Divino São Lourenço; Irupí, Iúna, Ibatiba and Conceição do Castelo; and (ii) Santa Maria River basin region: Santa Maria de Jetibá and Santa Leopoldina, the following final considerations are relevant:

- The sewerage systems projects are, based on the adequate technical and environmental aspects;
- The mitigation measures shall integrate the program and show themselves adequate to their objectives;
- These systems also attend to environmental and social safeguards related to the OP 4.04 – Natural habitats and OP 4.11 – Physical-cultural resources;
- Related to the aspects to attend the OP 4.12, the program contemplates a Resettlement Conceptual Policy Framework. Based on this Framework, CESAN developed an Expropriation and Real Estate Acquisition Plan related to 8 sewerage system.
- All enterprises already have their environmental license (LS) for the implantation;

**In this sense, the sewerage systems analyzed gather the technical legal and the Bank's environmental and social safeguards conditions for its implementation.**

Before the actual start of construction, these systems must present the additional environmental and social documentation related to: (i) effluent launch permit; (ii) respective vegetation suppression and/or APP areas intervention; besides (iii) the procedures established in the program environmental and social constant in the PGA – chapter 7.

## 6.2 ENVIRONMENTAL AND SOCIAL FRAMEWORK FOR THE OTHER PROGRAM ENTREPRISES

Considering that the remaining enterprises and studies of the Water and Landscape Integrated Management Program, to be financed by the World Bank, still are not, in the present preparation stage, with its detailed and complete conception, the environmental and social assessment undertaken adopted the following procedures:

For the **COMPONENT A - Integrated Water Management** – a general compatibility of the several management studies/instruments focused mainly on the subcomponents A.1 – *State Water Resources Plan* (PERH); A.2 – *Water Resources and Basin Framing Plan*; A.4 *Coast line Management*; e A.6 - *RMGV Integrated Urban Water Management*;

For the **COMPONENT C - Spring Management and Forest Coverage Recovery** an environmental and social analysis of the several actions of the components C.1 – *REFORESTATION* E C.2 - *MANGARAÍ DEMONSTRATIVE UNIT*, to the current preliminary conception;

For the **COMPONENT D - Environmental Sanitation** an environmental and social assessment of the sewerage system construction types that shall be financed by the program with the definition of environmental and social assessment criteria and procedures of the subprojects in the programs implementation stage.

### 6.2.1 COMPONENT A - INTEGRATED WATER MANAGEMENT

In relation to subcomponents **A.1 State Water Resources Plan (PERH); A.2 – Water Resources and Basin Framing Plan; e A.3 – Coast line Management**, considering that they can, in this stage define in a strategic level the hydro infrastructure implantation



possibility or the operational improvement of the existing infrastructure, it shall be considered the realization of a regional environmental assessment (Avaliação Ambiental Regional – AAR) or the incision in these plans of AAE elements in reference terms that allowed the environmental assessment of these interventions in a global and strategic level.

In that sense, when the programs is implemented, the reference terms of the plans above, shall contain the insertion of an environmental assessment in a more strategic level (including the environmental and social safeguards matters), adequate to the *water resources* planning. These reference terms shall be submitted to an evaluation and “no objection” from the World Bank supervision team.

In relation to the subcomponents **A.6 RMGV Integrated Urban Water Management** the following actions are predicted: (i) development of a metropolitan urban draining plan – PMDU, with non-structural actions (in a first stage) and the letter of priorities; (ii) intervention basic and executive projects in at least two areas; and (iii) construction of at least one of the proposed interventions.

For each of the two first stages, an environmental and social assessment shall be performed considering the following guidelines:

- a) During the preparation of the priority letter, where the macro drainage interventions of larger achievement of flooding impacts reduction, shall insert environmental and social components, in a regional character, so that the selection of alternatives and their prioritization considers technical, economic, environmental and social aspects together;
- b) In the basic and executive projects development, the insertion of each intervention specific environmental assessment, considering Brazilian legislation and the World Bank's environmental and social safeguards.

In the 2 aspects above, it is important to consider the application of procedures established in the OP 4.12. In this sense, Involuntary Resettlement Conceptual Framework shall serve as orientation for eventual population resettlement necessities in the predicted interventions as well as to the evacuation and land acquirement necessities.

In the construction period, the procedures established in the programs environmental and social management, contained in the PGA shall be followed, including the environmental construction manual and the environmental construction supervision.

## **6.2.2 COMPONENT B - RISK MANAGEMENT AND DISASTER PREVENTION**

In this component tools will be structured according to the development of the Risk and Disaster Management Policy (B.1), focused for the risk management, specially through identification and monitoring (B.2) and the construction of a disaster warning and preparation system (B.3).

In case of the detailing of the subcomponents that involve the implantation of infrastructural, a specific environmental assessment and the analysis of the possibility of family resettlement and/or the land acquisition shall be done.

## **6.2.3 COMPONENT C - SPRING MANAGEMENT AND FOREST COVERAGE RECOVERY**

This component divides itself in two, comprehending the subcomponent C.1 Reforestation Program and C.2 Mangaraí Demonstrative Unit Integrated Sanitation, Reforestation and Rural Roads Actions.

### 6.2.3.1 Subcomponent C.1 - Reforestation

These subcomponents comprehend fundamentally incentivates the correct environmental practices and the forest coverage conservation and recovery, besides promoting the adequate soil use. In the municipalities within Jucu and Santa Maria da Vitória basins, the the coverage expansion proposed shall reach 23,1% of the territory.

It's predicted an 8.3 thousand hectares forestry coverage expansion, in the next 5 years, distributed among 31 municipalities, performed in 2 distinct regions: the Caparaó region and the Jucu and Santa Maria da Vitória basins.

The Reforestation subcomponent presents a series of established stages the following way:

- 1) Mapping of the programs action areas;
- 2) Priority of the mapped areas;
- 3) Prospecting of the stakeholders and development of rural produces interest in the program;
- 4) Mobilization and registry of the eligible properties;
- 5) Technical project development for the selected properties;
- 6) Execution of the activities and prevision of payment for environmental services (pagamentos por serviço ambientais – PSA) to the producers;
- 7) Monitoring;
- 8) Critical and communication and analysis.

The **Intervention Technical Projects** (item 5 above) shall contain an environmental and social assessment, with an analysis related to the World Bank's safeguards, to be object of previous appreciation of the Bank supervision. The several stages above must be object of an environmental follow by the programs management unit (Unidade de Gerenciamento do Programa – UGP).

### 6.2.3.2 Subcomponent C.2 - Mangaraí Demonstrative Unit

The interventions foreseen in this subcomponent comprehend:

- Reforestation and vegetation coverage conservancy, to be performed by subcomponent C.1 above;
- Improvements and adequate of back roads (rural), regarding the soil conservation, including elements of solid continence like "dry boxes" ("caixas secas");
- Implantation of simplified water supply and sewerage systems for small communities within the basin;
- Implantation of linear parks close to the communities.

These actions still will be detailed based on the diagnostic and on technical projects and discussed with the local community during the program implementation.

From diagnostics and obtained results it will be possible to define the constructions and services that will be implanted in the Mangaraí demonstrative unit, precedence order. For these constructions it shall be observed: (i) the disposed in the Environmental Construction Control Program, PCAO, for the road recovery Works, established in the environmental management plan (Plano de Gestão Ambiental - chapter 7 of the abstract); (ii) the PCAO and PGAS (environmental manuals) appendix regarding the projects, constructions and maintenance of water and sewerage systems, for CESAN constructions in the area.

In the Mangaraí area there are records of quilombo communities, that shall not be affected or benefit by the programs predicted actions. However, the legal framework related to these communities shall be considered when the polygonal interventions are detailed

within the Mangaraí demonstrative unit, still under preliminary study. To attend the legal requirements associated to the communities' rights, having interference with quilombo territory shall be considered the applicable standards.

Likewise, it is necessary that they are established and described in the subcomponents proposals, monitoring mechanisms that guarantee, for the investments that will be done on the Mangaraí demonstrative unit's rural roads, follows:

- Adequate maintenance, with resources associated to the designated responsibilities;
- Resources for the cyclic capacitation of the city hall employees, operators that work of the rural roads and small owners;
- Effective interaction between stakeholders in the unit - IEMA, CESAN e INCAPER.

All the detailed projects, consulting contracting reference terms, sanitation demand diagnostic development shall be set to the World Bank for appreciation and no objection.

## 6.2.4 COMPONENT D - ENVIRONMENTAL SANITATION

Besides the systems with structured basic projects and that have already been object of analysis in item 6.1, for some cities, the system still lack distinct technical detailing that shall be completed (basic/executive projects and/or surrounding conditions in case of turn-key system) because of the programs implementation.

**Table 6.2 – Sewerage Systems to be detailed**

Region	Municipality	Sewerage system	Intervention type – system
<b>Medium Jucu Basin</b>	Marechal Floriano	Complete system implantation	Collection (home extensions, sewage and collector trunks)
			Transport (Elevator units, collector trunks or sewerage discharge tubes.)
<b>RMGV</b>	Cariacica	Bandeirantes system expansion	Sewerage Treatment Plant
		Rosa Maria da Penha system expansion	Home extensions, sewage and collector trunks extension.
	Vila Velha	Araçás system expansion	Implantation of elevator units.
		Ulisses Guimarães – Terra Vermelha system expansion	Home extensions, sewage and collector trunks extension.
			Implantation of elevator units.
			Sewerage Treatment Plant

According to CONAMA resolution 377 and IEMA IN 12/2008 these systems present themselves with the following size.

**Table 6.3 – Enterprise size**

System/City		Population (Hab.)	STP current capacity (l/s)	STP final projected capacity (l/s)	Size Conama 377/06 (1)	Size IN 12/2008 (1)
Marechal Floriano		6,499	0	12.6	Small	Small
Cariacica	SES Bandeirantes	31,100	250	250	Midsized	Midsized

System/City		Population (Hab.)	STP current capacity (l/s)	STP final projected capacity (l/s)	Size Conama 377/06 (1)	Size IN 12/2008 (1)
	expansion					
	SES Rosa da Penha expansion	5,173	48	48	Small	Small
Vila Velha	SES Araçás expansion	29,872	400	650	Midsized	Midsized
	Terra Vermelha	41,915	30	150	Midsized	Midsized

The following table 6.4 presents the main environmental impacts of the sanitation component and its significance and plans/programs measures assessment regarding the programs environmental management plan.

**Table 6.4 - Main Impacts and Risks Summary**

IMPACTS AND RISKS	SIGNIFICANCE	MITIGATION	PLANS/PROGRAMS
<b>CONSTRUCTIONS WORKS</b>			
Dwellers bothering	Mild	Construction planning and careless procedures and disclosure actions	Environmental construction manual
Interference with public systems	Little significance	Construction planning and articulation with traffic and service companies	Environmental construction manual
Vegetation suppression	Mild	Adequate constructive methods and restitution of the effected vegetation	Environmental construction manual
Degradation of areas and loan deposits	Mild	Construction planning and recovery of degraded	Environmental construction manual
Accidents	Mild	Accidents prevention procedures and construction planning	Environmental construction manual
Generation of waste dumps	Mild	Licensed residues destination	Environmental construction manual
Solid carriage to the rivers	Little significance	Adequate constructive methods	Environmental construction manual
Scaring of wild animals	Little significance	Construction planning and careful procedures	Environmental construction manual
Interference with archeological patrimony	Mild	Rescue occurrences and provide research	Environmental construction manual
<b>SYSTEMS OPERATION</b>			
Improvement of the water quality conditions	Mild	Adequate system operation and maintenance	STPs and receiving bodies monitoring

IMPACTS AND RISKS	SIGNIFICANCE	MITIGATION	PLANS/PROGRAMS
Sludges and residues disposal	Significant	Adequate final destination Definition of the routes of adequate disposal	Sludge management
Odors	Mild	Adequate system operation and maintenance	Contingency and risks
Gas emissions to the atmosphere	Little significance	Combustion of the gas generated in the anaerobic reactor	Contingency and risks
Sewage overflow in residences	Mild	Adequate system operation and maintenance	Contingency and risks
Stops of the pumping and treatment systems	Mild	Adequate system operation and maintenance	Contingency and risks

Analyzing the table above, it can be seen that the negative impacts during the implantation stage are, in general, localized, transitory and have little or mild significance, mainly arising from the construction activities.

However, according to the size and location, can present interferences as:

- Natural habitats – permanent preservation areas;
- Cultural and archeological patrimony;
- Commercial and/or residency buildings.

Adequate conception and project criteria can significantly minimize the possibility of these interferences.

In the case of natural habitats, the expansion or implantation of sewerage systems (interceptors, elevator facilities and treatment facilities) almost always present interferences with APPs. Considered by law a public utility intervention, this intervention can be authorized by the environmental agency and minimized with adequate construction techniques and with posterior intervention area recovery.

The possibility of intervention with cultural patrimony shall be analyzed in the enterprise conception and the environmental assessment, to adopt the rescue procedures if necessary, or “salvamento ao acaso” procedures. It should be noted that in the municipalities of Cariacica and Vila Velha were identified archeological and historical patrimony – see item 4.2.4 of this report.

Regarding the possibility of interference with commercial activities, the project conception and its execution must avoid it. Similarly the enterprise project shall avoid the necessity of family resettlement. In case, eventually, there is the need to relocate families, the specific plan must be performed according to the Involuntary Resettlement Framework contained in the environmental Management Plan.

### **Specific preliminary environmental analysis**

In spite that the sewerage systems presented in table 6.1, still lack of technical detailing (basic and executive projects), the systems in RMGV - Vila Velha (Araçás system and Terra Vermelha system – STP Ulysses Guimarães) are predicted to expand in CESAN properties in contiguous and current STPs.

Below is done an analysis of the STPs location and expansion.

### **Araçás system**

The Araçás sewerage system in Vila Velha was implanted by CESAN through the PRODESAN project, financed by the World Bank. Now CESAN wants to expand the current coverage of 51.8% to 66% of the Vila Velha city.

Araçás STP, currently operating, uses the activated sludge's process with extended aeration with UNITANK technology, where the same tanks are used as reactor and decanter depending on the stage of the process. It has a 400 l/s treatment capacity and currently finds itself with the affluent near it's installed capacity.

The technology adopted in the STP does not promote the liberation of odors that bother the neighborhood. Eventual bother, if existent, can result in traffic of trucks to the sludge dehydrated final destination. The treated effluent has as its final destination, through emissary, the Jucu River close to its confluence with the sea.

It is important to consider that CESAN acquired the STPs current land in 2001, PRODESAN period, already predicting the future need of expansion. At the time the STP was located 200 meters from the urban occupation. However, slowly, part of the surroundings has been occupied by irregular proprieties. However, as the process does not liberate odors,, there is no record of complaint from the community.

### **PRELIMINARY ENVIRONMENTAL ANALYSIS**

Two issues emerge from the STP expansion proposal:

- (a) Expansion of the STP in a place adjacent to the current STP. Regarding the STP location with the inferior distance of 100 meters from urban occupation, it must be considered that: (i) the area is CESAN's property; (ii) the area was, since 2001, predicted for expansion;(iii) currently there is no odor emissions and complaint from the local community; and (iv) there is the possibility of creating a access at the north side using the Darly Santos road, avoiding possible bothering for the population due to the truck traffic. The basic project must consider this alternative.
- (b) Treatment technology. CESAN predicts that the STP expansion shall be done with a UASB + Aerated Bio filter process, with sludge mechanic dehydration, and that guarantees a performance similar to the current unitank process.

### **Terra Vermelha system**

The Terra Vermelha system in wants to encompass and expand the current Ulysses Guimarães system.

CESAN wants to expand the region's sewerage system coverage area, going from a current 11% coverage to 100%, helping a 41,915 habitant population. For this, it is predicted the shutdown of the STP Ulysses Guimarães and the implantation of a new STP in the area.

### **PRELIMINARY ENVIRONMENTAL ANALYSIS**

Duas questões emergem da proposição de ampliação da STP:

- (a) STP expansion in a place adjacent to the current STP. Regarding the STP location with the inferior distance of 100 meters from urban occupation, it must be considered that: (i) the area is CESAN's property, already working as a STP; (ii) there is the possibility of a better internal location that can expand the distance

- between the facility and the urban occupation; (iii) there is the alternative of accesses on higher traffic capacity roads. The basic project must consider this alternative.
- (b) Treatment technology. CESAN predicts that the STP expansion shall be done with a UASB + Aerated Bio filter process, with a sludge mechanic dehydration, and that guarantees the non-emission of odors, therefore avoiding bothering of the population local.

### **6.3 ASSESSMENT REGARDING THE WORLD BANK'S ENVIRONMENTAL AND SOCIAL SAFEGUARDS**

Based on the program's components and subcomponents characteristics, the interferences with the World Bank's environmental and social safeguards: OP 4.01 – Environmental assessment; OP 4.04 – Natural resources; OP 4.36 Forests; OP 4.09 – Pest Management; OP 11.03 – Physical-cultural Resources; and OP 4.12 – Families Involuntary Resettlement.

#### **OP.4.01 ENVIRONMENTAL ASSESMENT**

The program was preliminarily classified as "B" category, generating the necessity of developing an environmental and social assessment, followed by an environmental and social management plan – RAAS and PGAS. The components and subcomponents that require environmental licensing are sanitation, with SES implantation or expansions in cities in the interior of Espírito Santo and in two cities of the metropolitan region of Vitória. For the systems in detailing stage, the PGAS present an environmental and social management system program.

#### **OP 4.04 – NATURAL HABITATS**

In the COMPONENT D - Environmental Sanitation, that have the programs constructions, the sanitation system conception seek minimally interfere in non-anthropic areas and there is no interference with conservancy units. Some of the system's small stretches coincide over permanent preservation areas – APPs. Considered by law as public utility intervention, this intervention can be authorized by the environmental agency and minimized with adequate construction techniques and posterior intervention area recovery.

In component C – reforestation and Mangaraí demonstrative unit subcomponents, there will be permanent preservation areas – APPs intervention, which are the subcomponent's objective – recover the APPs of the selected sub-basin with sustainable techniques, native species and commitment of the landowners with the adequate soil use in fragile areas. In this case, there is convergence with the objectives of the safeguards, natural habitats conservation, as well as protecting and improving the environmental, aiming the long term sustainable development.

#### **OP 4.09 – PEST MANAGEMENT**

The component C – spring and forest recovery management is the only program component that could trigger this safeguard. The subcomponent reforestation uses native species and prepares producers for sustainable land management in plantations. The reforestation program mentions the use of low toxicity herbicides and ant killing poison for

the ecological pest control (mainly ants) in the implantation areas during the seedling stage. Pesticide Management Manual contained in the RAAS.

#### **OP 4.11 – PHYSICAL-CULTURAL RESOURCES**

According to the research in RAAS, in the municipalities of Cariacica and Vila Velha archeological sites and historical goods were identified. In the case of these municipalities, besides the fact that the intervention of the sewerage systems are in anthropic areas, a previous assessment of the possibility of intervention with cultural patrimony must be carried out, as the adoption of specific “salvamento ao acaso” procedures during the construction stage.

Regarding subcomponent A.6 - *RMGV Integrated Urban Water Management*, the Macro drainage Master Plan studies and basic/executive projects shall contain a specific cultural patrimony intervention assessment.

#### **OP 4.12 – INVOLUNTARY RESETTLEMENT**

The identified program’s constructions do not require the resettlement of families of businesses. However, the sewerage and RMGV draining (Plano Diretor Metropolitano de Drenagem) interventions still have to be studied. However, considering the acquisition of lands for the implantation of part of the sewerage system’s units and eventual need of involuntary resettlement an Involuntary Resettlement Framework that is contained in Chapter 8 – PGA and the annex to the present report. Therefore, the OP. 4.12 criteria and standardization are granted at the moment of eventual disaffection of areas and removal of families and businesses.

#### **OP 4.36 FORESTS**

Similarly to the safeguard 4.04, the objective of the reforestation and Mangaraí demonstrative unit is of its preservation; it aims to increase the forest coverage of a very important biome, the rain forest. Therefore, one of the program’s objectives is the expressive recovery of these massive forests, attending the presupposed safeguard, of integrating the forest in an efficient way for the sustainable economic development.

### **6.4 GLOBAL ENVIRONMENTAL AND SOCIAL ASSESSMENT**

The impacts considered most important in the program implantation context are the ones related to: (i) the sewerage system implantation; and (ii) the increase of the forest coverage and permanent preservation areas recovery. In both cases, the generation positive impacts that compensate the negative impacts, associated to the construction stage and operational system is expected.

For the components (A, BA and E), basically of studies, plans and programs, the expected impacts are highly positive, coming from the implantation of new *water resources* planning and management instruments, support for the state environmental system, improvement of the urban draining management and institutional strengthening of the institutions participants of the program.

For the activities related in component C – forest coverage recovery, APP and rural roads recovery, likewise the expected positive impacts are associated to the component’s implantation. Show benefits derived from: (i) increase of the native forest coverage; (ii) reduction of solid carriage and improvement of rural road safety; (iii) better agricultural practices; and (iv) environmental law compliance, with the APP and portions of rain forest



recovery, generating awareness and good practices to the rural producers in the region attended by the program.

In the case of the sewerage systems present in component D, highlights its sewerage collection and treatment implementation nature, action focused to provide the population health and environmental quality, once contributing for the water bodies contamination control.

The potential adverse impacts result fundamental from the construction stage, are localized, small, transitory and likely controlled and mitigated by the adoption of already identified measures and, specially, of the construction's environmental control.

Through the Water and Landscape Integrated Management Program, the State wants to achieve the following goals:

- a. Increase the State's forest coverage to 12%, corresponding to an increase of 5%;
- b. Increase the forest coverage in the micro regions of Caparaó to 12.6%; and in the municipalities within the Jucu and Santa Vitória river basins to 23.1%
- c. Increase the sewerage collection, treatment and final destination in the municipalities within the Jucu and Santa Maria da Vitória river basins from 47% to 100% and, in the micro region of Caparaó 11.5% to 100%;
- d. Increase the sewerage collection, treatment and final destination in the RMGV from 62% to 69%.

The resources inverted in the program will attend these goals, which are part of a State government management and planning strategy to endow Espírito Santo of public policies focused in contributing to the reduction of the social environmental vulnerabilities.

With the program now in preparation, the government guarantees the continuing of the sanitation, improvement of the *water resources* management and the State environmental system, besides the institutional strengthening of these sectors public management.

The execution of the program of the Water and Landscape Integrated Management Program would risk the continuance of this government strategy, which has been being applied successfully and has counted with the support of external resources like the World Bank, in previous projects.

## 7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN- PGAS

The Environmental and Social Management Plan contains the draft of the environmental measures (in specific programs) and social (especially those that correspond to the involuntary resettlement of families and businesses) destined to minimize and/or compensate the impacts and risks derived from the construction implantation and operation and the program interventions. Also contemplates the support activities necessary for the institutional strengthening of entities related to the program, shall it be in the implantation or operation of the implanted systems.

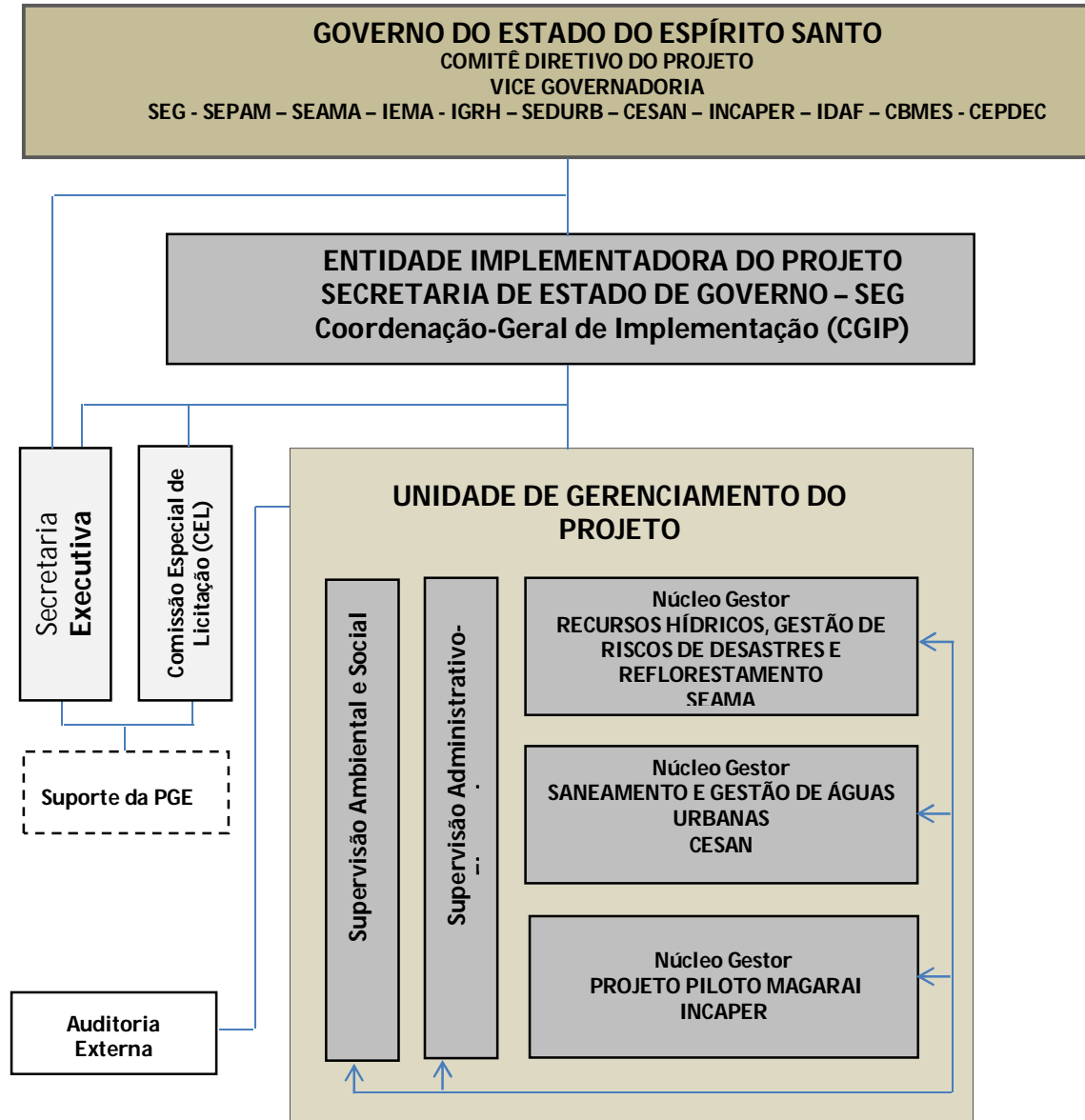
The programs that constitute the PGAS are described as follows:

**Table 7.1 - PGAS – Programs, Costs and Associated Responsible.**

PROGRAMS	COSTS	RESPONSIBLE ORGANISM
Social environmental program management	Inserted in the program	UGP

PROGRAMS	COSTS	RESPONSIBLE ORGANISM
	management cost	
Social environmental criteria and procedures for the sanitation projects conception and assessment	Inserted in the program management cost	UGP and Executors
Water – receiving bodies quality monitoring	<b>R\$ 5.400.00,00</b>	CESAN – Own Resources
Mangaraí program monitoring	<b>R\$ 2,546,000.00</b>	CESAN
Social communication program (Programa de Comunicação Social – PCS)	To be detailed by UGP	UGP
Environmental and sanitary education program (Programa de Educação Ambiental e Sanitária – PEAS)	To be detailed by UGP	UGP
Environmental access and education program – Se Liga na Rede	<b>R\$ 5,953,240.00</b>	CESAN
STPs sludge's management	<b>R\$ 280,000.00</b>	CESAN
Contingency and risk reduction program	<b>R\$ 180,000.00</b>	CESAN
Pesticides Management Manual	No charge	IEMA e INCAPER
Construction environmental control program – Environmental construction manual	No charge. Company activities	CESAN, IEMA e INCAPER
Involuntary Resettlement and Land Acquisition Framework	No Charge	CESAN

In this program management institutional arrangement is presented in following figure:



**Figure7-1 – PGAS Institutional Arrangement**

A Directive Committee, Implementing Entity of Project and its executive secretariat and a program management unit predicted, operational character.

To give UGP technical-operational support a management company will be contracted, through public bidding, which will also be responsible over the UGP technical team to act in the program activities management process. This management company will establish together with UGP, the connections between public entities and private stakeholders.

## 7.1 PROGRAM'S SOCIAL ENVIRONMENTAL MANAGEMENT

The UGP (environmental supervision) social environmental unit will have the responsibility of:

- Accompany all program stages, identifying and evaluating the alternatives, to select the environmentally adequate one;
- Assure the environmental and social assessment insertion in the studies and projects that will be developed the program executors;
- Analyze the reference terms and notices documents for the programed contractions, guaranteeing the environmental and social aspects insertion;
- Give technical-environmental support on the contract management;
- Give technical support in the elaboration, formatting and implementation of institutional strengthening actions;
- Give technical support to the main coordination, executive secretariat and others agencies and entities that comprise the program's institutional arrangement;
- Follow the development, by the executors, of the documentation required by the environmental and financing agencies for the program environmental licensing;
- Give support in the several licensing process, special authorizations, and land regulation, if necessary, and accompany the conditions compliance and environmental licensing requirements; the executors (CESAN and IEMA, among others) are responsible for the licensing of each intervention, but the UGP and EG will give necessary support;
- Follow the environmental and social supervision and inspection of the construction, including the sewerage system pre-operation activities that will be implanted, to verify the fulfillment of the requirements predicted in the environmental construction control program (Programa de Controle Ambiental de Obras/MAC);
- Coordinate the project's social environmental actions.

Below are presented the main functions related to the Project environmental management.

- ***Environmental and social management coordination (environmental and Social Supervision)***, exercised by a specialist allocated in UGP that will be responsible for the program's social environmental actions, subordinated to the Program's General Coordination.
- ***Construction environmental supervision***, exercised by a contracted specialist(s) in the construction supervision company, which will be responsible for the inspection, following and orientation of the environmental actions related to the environmental construction manual – MAC and the mitigation measures indicated in the environmental licenses, in this management proposal and the remains PGAS programs.
- ***Environmental construction planning***. The environmental construction planning are of responsibility of the construction companies that shall follow the environmental construction control (Programa de Controle Ambiental de Obras/MAC) and implement the mitigation measures containing of environment licenses and the construction contracting notice (Edital de Contratação de obras).

#### **7.1.1 ENVIRONMENTAL MANAGEMENT AND SUPERVISION DURING THE PROGRAM CICLE**

During the programs implementation, the UGP shall adopt differential social environmental procedures for each component involving the stages of:

- **Studies and projects detailing**, involving: (i) Environmental criteria for Project detailing; (ii) Projects environmental assessment; (iii) Environmental management

- for the recovery of rural roads guidelines; (iv) mitigation measures and specific environmental management plans; (v) Disclosure and public consultation procedures.
- **Bidding process**, with the insertion of environmental criteria in the construction bidding and contraction.
- **Construction – physical interventions**, with the description of the construction environmental planning and supervision activities.

The PGA constant in the environmental and social assessment and framework report (Relatório de Avaliação Ambiental e Social e Arcabouço) for the programs environmental and social management brings in detail the procedures that must be adopted by the UGP and the executor entities.

## **7.2 RECEIVING BODIES WATER QUALITY MONITORING PROGRAM**

The program involves the sewerage systems receiving bodies implanted by PRODESAN, Clean Water Program and by Water and Landscape Integrated Management Program, and clearly defines the following aspects: (i) the water to be monitored; (ii) the locations where the samples will be collection; (iii) the parameters that will be analyzed; (iv) collection frequency; (v) the analysis methodology.

## **7.3 MANGARAÍ DEMONSTRATIVE UNIT WATER QUALITY MONITORING PROGRAM**

With the objective of monitoring the results from the actions from subcomponent C.2 – Mangaraí demonstrative unit over the water quality, the monitoring program presents: (i) Definition of the monitoring points in the Mangaraí sub-basin, monitoring points in control sub-basin, and the monitoring point along the Santa Maria da Vitória river, and downstream of the control sub-basins, the Mangaraí sub-basin and the Rio Bonito small hydro power plant; (ii) Definition of hydrological, solid transports measuring and output measuring control points; (iii) definition of precipitation monitoring points with the installation of pluviographs; (iv) Monitoring parameters; (v) Collection frequency; (vi) Analysis methodology.

## **7.4 SOCIAL COMMUNICATION PROGRAM – PCS**

The program's coverage must be consider, basically, two themes: (i) the program importance disclosure as a structural axis of Espírito Santo's water management; and, (ii) the sanitation service complementation activities that will be installed in the different State municipalities and improvement of the population, benefited by these services, life quality. Must divulge the enterprises stages and actions, in the implantation and operation stages, establishing a permanent connection between entrepreneur and the communities directly and indirectly impacted, in order to reduce possible conflicts and relational problems related to the implantation of the enterprise. The PCS specific objectives are: (i) Create a positive image of the enterprise; (ii) Seek the integration between the public entrepreneur and the local community; (iii) Make possible the participation of the community affected by the enterprise; (iv) Work strategic themes, traversals to the program that demand the mobilization of great crowds, not affected by the specific programs – PEAS; (v) Create direct communication channels between the executor and the society. The PCS must inform the following publics: (i) Population of affected municipalities; (ii) UGP technicians and construction workers; (iii) Government and non-governmental agencies and institutions of the enterprise influence area.

## **7.5 ENVIRONMENTAL AND SANITATION EDUCATION PROGRAM – PEAS**

The main objective of this program is to transform the environmental concern in practice, based on the issues experimented by the local populations every day. The PEAS must be structured in interdependent and complementary actions, like this defined: (i) line of action 1 – environmental education for the installed sanitation infrastructure protection, has as reference public the populations that municipalities that will use the installed sanitation infrastructure or live in the areas surrounding this intervention; (ii) line of action 2 – local environmental education, focused on the population directly affected in the areas where the interventions will occur and its surroundings; (iii) line of action 3 – environmental education and access plan – “se liga na rede” that aims to develop informative and educational actions with the objective to value the treated water and the adequate destination of domestic sewerage (CESAN model for RMGV).

## **7.6 STP SLUDGE MANAGEMENT PROGRAM**

The sludge's and residues resulting from the sewerage treatment facility must have feasible economical destination, environmental acceptable and secure in terms of public health that, currently, are disposed by CESAN in licensed landfills. This solution can be improved in the environmental and economic aspects.

The Sludge Management Program should examine, inter alia, the following alternatives: (i) Implementation of a UGL in the region, in order to process the sludge and allocate it to areas neighboring agricultural, (ii) Implementation of a small landfill dedicated to receive the sludge and waste from treatment plants in the region, until the state to deploy a municipal solid waste landfill in the area, (iii) Transporting them to landfills licensed RMGV.

The assessment should be made using multiple criteria analysis that considers the environmental, social and economic alternatives. The most advantageous alternative should be adopted by CESAN for the sludge disposal stations in the region Caparaó.

## **7.7 CONTINGENCY AND RISK REDUCTION PROGRAM**

Its objective is to establish procedures and routines for contingency situations and environmental risk reduction, arising from sewerage system operation, overall for those risks that can result in significant environmental and social impacts, like (i) residence flooding due to the break of sewerage collectors; (ii) lack of electricity with the STP's and Elevator operational stop; (iii) STP's and Elevator's operational problems with system performance loss, (iv) maintenance interventions with traffic deviation, (v) sewerage overflow, (vi) Accidents and others.

## **7.8 PESTICIDES MANAGEMENT MANUAL**

Interventions recovery of vegetation coverage under Component C must act, among others, in permanent preservation areas - APPs. These areas should be undertaken activities revegetation with native species which foresees the use of organic fertilizer, and eventually the application of insecticides with a view to fighting ants that may be hindering the normal development of seedlings.

Aiming to guide the possible application of ant presents the raas, pesticides management manual, included in the report of environmental and social assessment - rass - annex viii, with the standards and care for your application.

IEMA and farmers, responsible for the implementation of revegetation projects, will be required to follow the instructions in this manual and the pmu will be responsible for overseeing its implementation.

## **7.9 ENVIRONMENTAL CONSTRUCTION CONTROL PROGRAM (PCAO)**

Environmental construction manual – The construction of new projects or expansion of existing sanitation systems are characterized by the insertion of new transport units and the sewerage treatment, to implement improvement or expand the service capacity. These activities carry an environmental risk potential that must be prevented by engineering practices that attenuates the arising environmental aggressions and the area recovery procedures that perhaps will be degraded. CESAN is responsible for the periodic and systematic inspection, for that using a model of check-list of the environmental protection based on the MAC and pertinent law. In this program is predicted a review of the MAC, which is incorporated to the bidding process so that the companies have a previous knowledge of the conditions that must make a contract requirement. The MAC review must contemplate, at least the following items: (i) Social environmental management system of the enterprise implantation with environmental coordination, supervision and planning responsibilities and the definition of the documents and plans that will have to be generated in all construction stages; (ii) Environmental actions and rules related to the construction implantation and management, that contemplate a construction familiarity plan: (a) construction site; (b) construction risk and emergency actions management; (c) workers environmental education and code of conduct at the construction; (d) health and safety at the construction; (e) residues management and disposal; (f) noise control; (g) equipment yard; (h) traffic control; (i) service roads; and further environmental aspects and risks associated. Construction environmental planning and supervision likewise are themes to be included in this review.

## **7. 10 INVOLUNTARY RESETTLEMENT AND LAND ACQUISITION FRAMEWORK**

This framework proposes the definition of fundamentals, and the procedures that will help the development of the involuntary resettlement program and the expropriation and real estate acquisition, if and when necessary its elaboration depending on the sanitation and draining interventions that the PDMDU will come to propose. Likewise, describes the specific procedures for the acquisition of real estate for the sewerage predicted in the program.

### **Expropriation and Real Estate Acquisition Plan**

Based on the Involuntary Resettlement and Property Acquisition Concept Framework mentioned above, CESAN elaborated a expropriation and real estate acquisition plan (Plano de Desapropriação e Aquisição de Imóveis), according to OP 4.12 procedures, for

the sewerage systems facilities of the **8 municipalities that count with the detailed Project**. This plan comprises the process of expropriation-acquisition of private real estate as well as the assignments of public areas by the respective city halls and the emissary passage terms.

## **8. PUBLIC CONSULTATION**

The Program is classified in category “B” according to the OP 4.01 – Environmental Assessment.

The Program preparation, regarding the environmental and social safeguards developed a series of documents that were made available and discussed in the 3 public consultations and in the complementary meeting as commented above.

The following documents were prepared and made available:

- Executive Summary of the Environmental and Social Assessment
- Environmental and Social Assessment and the Program Environmental and Social Management Framework
- Program Environmental and Social Management Framework
- Resettlement Policy Conceptual Framework
- Expropriation and Real Estate Acquisition Plan

The divulgation (with the possibility to download) was done through the Vice Government (Project Directive Committee) and other Espírito Santo Government Bodies, SEPAM, CESAN, INCAPER and IEMA websites, as from May 2<sup>nd</sup>, 2013.

Espírito Santo State Government performed three public consultations, observing the strategically logistic of the participation of the population affected by the programmed investments:

- Date: 05/20, 19h, Vila Velha City, Metropolitan Region of Vitória;
- Date: 05/21, 18h, Lúna City, municipalities in the interior region of Caparaó; and,
- Date: 05/22, 18h, Santa Leopoldina City, municipalities in the interior region of Santa Maria da Vitória and of Jacu.

To complement the clarifications in the Caparaó region, the Project staff, coordinated by SEAMA representation, and partnership of the Caparaó Consortium, promoted a new release to attend and clarify doubts pointed at the public consultation performed in Lúna, which occurred in programmed meeting in the region on 06/12/2013.

For the performance of the consultation, the State promoted social mobility with the creation of invitations to the state and municipal public entities, basin committees, rural producers association, residents associations, NGOs, syndicates, etc.

The consultation had the following dynamic:

- (i) Opening with the presentation of the consultation objectives, divulgation and access of the documents produced information. Opening remarks of hostess authorities.
- (ii) Presentation of the Program development and its components. The Program presentation structure varied according to the region to expose the general development of the main points related to the focus region;
- (iii) Environmental and social assessment presentation, its main conclusions and the environmental and social management plan;
- (iv) Reception of the formulated written questions by the present public, clarifying by the exhibitors and corresponding debate;



- (v) Opening of the work for the new public questions, positions, etc. and debate;
- (vi) Closure.

The consultation organizing staff collected the presence list, audio recordings for records together with the respective minutes.

It was evidenced a very efficient mobilization by the organizing staff with the participation of several segments of the society.

Generally, in all the consultation there were favorable manifestations to the Program and its components. The climate was harmony and integration, being that the questions raised had the objective of clearance, suggestions, etc. The debates where very interesting, with intense participation of the public and "satisfaction" of the responses.

The public consultation minutes recording report together with the presence list, integrates the RAAS Annex volume.