SECTOR GUIDELINE FOR SOCIAL AND ENVIRONMENTAL MANAGEMENT IN IWRM PROJECTS

SECTORIAL GUIDE
DRINKING WATER AND BASIC SANITATION

1. Introduction

According to a the United Nations General Assembly statement, 884 million people in the world are currently lacking access to safe drinking water, while more than 2,600 million people have no access whatsoever to basic sanitation. Every year, 1.5 million children under five are dead, and 443 million working days are lost due to diseases being caused by poor water and sanitation conditions. By 2012, 96% of the population in the American Continent had access to upgraded drinking water sources, and to 88% improved sanitation services vis-à-vis 90% and 64% worldwide.

Unsafe water, lack of basic sanitation, and hygiene are preventable risk factors having a large bearing on rising mortality and morbidity, as they intensify transmission of diarrheal diseases (cholera included), trachoma and hepatitis.

On 26 July 2010, such a disturbing situation prompted the United Nations General Assembly to adopt resolution GA / 10967 (The Human Right to Water and Sanitation), pursuant to which access to water and sanitation was deemed as a human right, turning both, water and sanitation, into key elements of people´s dignity and personal growth, as a critical social determinant of health, and paramount to alleviate poverty.

As set forth by the World Health Organization, the American region as a whole has succeeded in reaching the United Nations Millennium Development Goal No. 7: "sustainable access to safe drinking water (90% coverage or higher)," and could even reach the basic sanitation goal; however, progress by individual countries has been rather uneven while major differences within them are still apparent. Seven per cent of the region´s population (38 million people) have no access to upgraded drinking water sources, while supplying people with a suitable surveillance and control of drinking water quality, sanitation and water distribution systems is restricted, in particular in rural areas.

While rural people in developing countries in Latin America and the Caribbean (10) are usually facing up greater restrictions than urban dwellers in access to water and basic sanitation; their situation is even worsened by a more deficient healthcare centres provision, as a higher morbidity rate vis-à-vis urban population shows.

Over the 1990 - 2010 span of time, more than 162 million people in Latin American and the Caribbean managed to access upgraded water sources, while improved sanitation reached some 154 million people. Most countries increased their water supply rate

coverage to over 75%, while many countries even reached a 95% figure. However, most countries are currently facing serious water quality problems as a result of operation services maintenance shortcomings, basically.

2. Objective

This Handbook is intended to steering the incorporation of environmental and social management basics into the formulation, design, execution, operation, and up-keeping of drinking water and basic sanitation projects, for which finance is being applied for to CAF - Development Bank of Latin America.

3. Scope

This sector handbook entails that drinking water and basic sanitation should be understood to abide by the definition being inferred by the Millennium Development Goals´ target 10, for which the Joint Monitoring Programme, the World Health Organization and the United Nations Children's Fund (UNICEF) (12) are responsible. In this regard, drinking water is being defined by this Handbook as that water being used for domestic purposes, personal hygiene, drinking and cooking. While basic sanitation entails the safe disposal -at the lowest possible cost- of excreta and wastewater, to ensuring a clean and healthy environment both, at home, and in people´ surrounding areas.

4. Approach

This handbook has been motivated by the sustainable development philosophy, as set forth by the Rio Declaration ("Earth Summit" United Nations Conference on Environment and Development, 1992), which, in turn, was based on the 1987 Brundtland Report ("Our Common Future"). In accordance with the above, economic development, the use and protection of natural resources, social and equity, and inclusion should be integrated into one single concept.

5. Representative Aqueduct And Basic Sanitation Systems Project Works

To identify, plan, implement, and update environmental and social management as required for drinking water and sanitation projects to be executed, the relevant project design features should first be known and understood. Facilities, works and functional elements making up drinking water and basic sanitation systems, together with the territorial settings in which they are located, have a major bearing on the impacts which,

the project design, construction, operation and maintenance could have on environmental and social components.

In drinking water projects in particular, the vision should be a holistic, because even in the case of predominantly urban projects, their origin is usually a rural based area in which ecosystems acting as untreated water sources are usually prevalent.

A summary of water catchment, treatment, purification, distribution and final disposal for further household sewage purification is shown below.

5.1 Urban Aqueduct Systems

Usual facilities in these systems are:

Untreated surface water storage reservoirs: Dam reservoirs, their landfills, energy absorbers and drainage system. Usually, water to be stored in dams should be diverted by constructing temporary tunnels and channels on the surface of the area intended to be flooded. It may be necessary to clear vegetation before filling the reservoir. If the dam is made of earth, clay material should be mined. Storage operation may require the construction of diversion works.

Water intakes: works intended for water catchment from a reservoir or directly from a river, creek or natural lake.

Deep or shallow groundwater catchment wells: are drilled into aquifers. Sometimes artificial groundwater recharge works are required through building of infiltration reservoirs or recharge wells. The potential impact on water quality in the aquifer and / or their recharge sites should be taken into account.

Water conveyance lines: pipelines for pressure- or gravity-based conveyance of untreated water from the catchment area to the water treatment plant. Pre-treatment facilities and pumping equipment may be included.

Aqueducts: Works and equipment to remove sand, monitor taste and odours, micro-sifting, removing fats and oils, aerating, quick clotting-mixing, flocculate, settle, quick / slow filtering, disinfecting, store to set contact time for disinfection, stabilize, soften, remove iron and magnetic property, ballast flocculation, float, laboratory water tests, use

of operating rooms, metering, instrumentation and control, chemical substances storage and treatment, and disposal of removed sludge.

Water conveyance lines: Pipelines to transport water from the water treatment plant to the distribution system. Pumping equipment may be included and tunnels or pressure pipes may be used.

Treated water storages: Water storing and compensation tanks feeding distribution networks. They are usually located in consolidated urban areas or in suburban areas and may be underground, partially buried or elevated tanks.

Water Distribution networks: A set of pipes, fittings and structures conveying water from storage tanks or treatment plants to consumption places following a linear path along urban or suburban roads. Storage and compensation tanks keep the water supply service pressure and continuity.

Pumping stations: They raise the hydraulic grade line level to overcome the level of topographic height difference, plus friction losses and lower losses, provided that gravity harnessing is not feasible. They are used both for water catchment and distribution network.

5.2 Rural Aqueduct or Water Supply Systems

Usually, both works and installations are the same as those for urban systems, when their purpose is to provide drinking water to smaller rural clusters or groups of houses arranged in a nucleus, or urban-configuration villages (100-2500 inhabitants), but involving minor works and less technical complexity. Scattered rural homes that cannot be connected to these supply systems get their water from springs, streams, ditches, ponds or through rain water storage concrete or plastic tanks collecting water from house roofs, or from reservoirs dug into the ground (called jagüeyes in Spanish). Water thus collected should undergo a filtration, disinfection and boiling process to be fit for human consumption.

5.3 Urban Sewerage Systems

A set of pipes, collectors, interceptors and relief structures to collect, carry, treat and dispose of wastewater from premises connected through a sanitary sewage using a linear path in urban or suburban roads.

5.4 Combined Sewerage Systems

A set of pipes, collectors, interceptors and relief structures to collect, transport, treat and dispose sewage mixed with rainwater drainage coming from premises connected through a sanitary sewerage and surface drainage network, through a linear path in urban or suburban roads.

5.5 End sewage outfalls

Matrix collectors carrying wastewater or combined water to dumping sites (combined sewer systems overflow) or wastewater treatment plants (sewerage systems). End sewerage outfalls do not take home sewage connections along their path.

5.6 Home wastewater treatment systems

Works enabling the physical, chemical, and biological transformation process of household wastewater for purification before final disposal, and pursuant to applicable law.

5.7 Undersea sewage outfalls

Systems for final discharge of domestic sewage into the sea (usually undergoing a preliminary treatment), through a conveyance pipe and a diffusers-based download, at a depth and distance from the coast not posing any risk to human health and the environment.

5.8 Rural Sewerage Systems

Usually, when their purpose is to evacuate domestic sewage from rural settlements or villages with nucleated houses and a population between 100 and 2,500 people, these are the same works and facilities as those for urban sewage systems. For the proper disposal of domestic wastewater being generated in isolated rural dwellings alternative technology should be used, such as septic tanks or dry or wet-type latrines.

6. Guidelines for Sustainability of Drinking Water and Basic Sanitations Projects

In some cases, drinking water and basic sanitation projects in rural areas in particular stop operating shortly afterwards their implementation, or their operational features are greatly curtailed, in which case service quality is below standards. Usually, the reasons for this situation may be grouped together into technological reasons and / or the local capacity of rural communities. For a water supply and sanitation project being designed on the basis of alternative technologies to be sustainable, the following aspects should be ensured:

- Taking advantage of ecosystem resources (local inputs and energy)
- Contributing to environmental conservation, reuse / recycling of environmental resources, use of alternative energy sources without generating any adverse impacts on the environment
- Supplying the service as scheduled, including: quantity and quality of drinking water, easy and / or adequate access to water and sanitation, continuity and reliability
- Supplying an uninterrupted and indefinite service bearing in mind the infrastructure design or life cycle
- The project should be jointly managed with the community to provide the water supply service or, alternatively, the community should manage this service
- Low operation and maintenance costs
- Locally operated and maintained with limited or minimal external support
- An operation technology in line with local culture and in accordance with the financial and technical capacity of the community, both in terms of construction, operation and maintenance, and regarding a comprehensive use of water resources.

Drinking Water and Alternative Technologies

Technologies suitable to meeting management requirements as follows:

Catchment: Uptake and protection of water resources in their natural form, being collected from surface, ground and / or rainwater sources.

Drilling: Construction of water uptake wells.

Impulse: Conveyance of water collected from dug wells and / or deep wells into a treatment or storage well system.

Treatment: Water treatment for human consumption.

Storage and regulation: Storage of volumes of water reserves and regulation.

Distribution: Conveyance of drinking water to consumers or users through public networks.

Basic Sanitation and Alternative Technologies

Technologies suitable to manage requirements as follows:

Intermediate use appliance: A toilet and / or urinal used for excreta disposal. Low water consumption devices should be used (3-6 litres of discharge per pulse), and other appliances.

Collection, storage and treatment: Technological devises or mechanisms for collecting and storing excreta and giving them partial treatment. Excreta require further treatment before disposal.

Transfer: Transport and conveyance of excreta to decentralized sewage treatment systems, including domestic wastewater collection through sewage systems.

Centralized and decentralized treatment: Suitable for user groups, neighborhood units, suburban neighborhoods, housing developments, which may or may not be a part to a centralized or decentralized sewage treatment system. Treatment and disposal of sludge is included.

Reuse and / or final disposal: Methods and technologies to return the final treated product back to nature with a minimal risk or impact, or as a usable resource for agriculture, landscape irrigation, and some other purposes.

Depending on the type of works required, some environmental and / or social impacts may occur, the prevention, mitigation or control of which should be foreseen by the project by designing, implementing, and monitoring measures as appropriate. To prevent, mitigate, and keeping potential impacts in check, the formulation, design, construction, operation, and maintenance stages of a drinking water and sanitation projects should apply provisions related with: environmental legislation applicable to the sector and / or type of project; relevant technical standards and best environmental and social practices; as well as CAF environmental and social safeguards, the latter institution, as a likely finance source for the project.

A lack of maintenance and overhauling of equipment and facilities in water treatment, and wastewater treatment plants having a higher processing capacity than rural systems, can

also result in a lack of sustainability, not only on account of an adverse impact on access to and consumption of drinking water, sewage quality and environmental quality, but also on financial investments in building, operating and maintenance of those systems.

Undoubtedly, it will always be less costly to timely invest in a proper working of these systems than to face challenge belatedly, in particular once environmental and social impacts associated with the lack of drinking water and basic sanitation have become apparent (morbidity, mortality, air pollution, water and soil contamination, social conflicts, to name only a few).

Usual environmental and social forecasts, bearing in mind the project cycle states, which drinking water and basic sanitation projects should bear in mind to apply to CAF for partial or total funding, can be summarized as follows:

6.1 Relevant Environmental Legislation

The project should be fully aware of the environmental and social framework (laws, decrees, resolutions, regulations, etc.) in force in the country where it is to be executed, and this framework should be duly enforced in activities being envisaged for each stage of the project activities (planning and design, execution, operation and maintenance, and abandonment). Likewise, the project should bear in mind environmental and social obligations pursuant to treaties, conventions, and any other international instruments to which the country concerned is a signatory or has adhered to, otherwise.

Moreover, the project shall incorporate engineering and equipment obligations as spelled out in technical standards specifying the particular project and apply to it, in particular, when those technical standards are compulsory vis-à-vis the relevant legal framework in force.

6.2 Land Use Planning

The availability of land use plans being implemented by the governmental and administrative authority should be looked into by the project as a first reference framework for the location of the proposed project site. At times, such plans are still on the making, or the location originally chosen as the project site is not compatible with the different areas for uses allowed as foreseen in those plans. This consideration should be duly taken into account in the planning and design stage of the project.

If the project in being envisaged to be executed in a region having no land use planning regulations at any governmental and administrative level, appropriate consultation should be held on the feasibility of the project with relevant governmental and administrative bodies as required. When, notwithstanding a lack of land use planning regulations a project is executed and enters into operation, and the region in which it is located is subject to a subsequent declaration of (natural or cultural) protected areas, or some other forms of territorial planning, the project promoter should take the initiative and approach the competent authority in order to contribute in the design of lad use management instruments as required (management plans, land use and zoning). Thus, the project shall ensure that its operation shall be in line with the new land use regulation, thus contributing to an effective management of the new territorial structure.

6.3 Relevant Environmental Authorities

To ensure the successful operation of any drinking water and basic sanitation project, relevant environmental authorities should be duly identified and a deferential relationship with them established. This process starts at the project planning and design stage, and ends only at the project abandonment stage, as such authority shall have jurisdiction to approve the project feasibility, its execution and equipment, oversee its operation and maintenance, and approve project dismantling and abandonment.

Depending upon the project site location and the political and administrative structure prevailing in the country in which the project shall be executed, national, regional, departmental, state, provincial, municipal authorities shall be in charge of overseeing the project as appropriate in each particular country). Sometimes, the project should be managed pursuant to the provisions and procedures of one or two of these authorities only, sometimes all of them are involved.

The project´s abidance by environmental and social provisions as set forth by such authorities shall ensure it is approved, executed, operated, maintained and abandoned without mishap; this not only ensures that the project is in line with applicable environmental and social legislation, but also that the project can avoid incurring in higher cost likely to result from fines, orders to clean up environmental liabilities and, even, the decommissioning of the project, in case of non-compliance before the competent environmental authority.

6.4 Environmental and Social Evaluations

Environmental and social surveys evaluations should be conducted over the planning and design stages and, depending upon the type of drinking water and basic sanitation project

concerned, these surveys should have been conducted before the start of the execution phase, as these surveys are a usual technical prerequisite for the relevant environmental authorization to be granted.

When drinking water and basic sanitation projects of a given size are concerned, the project developer should undertake those environmental and social surveys directly or through specialized consultants, as appropriate.

Baseline surveys and environmental impact evaluations shall be performed within the scope of the project´s environmental approval. All environmental physical, biotic and socio-economic characteristic should be surveyed as from execution, and operation / maintenance works related to typical drinking water and basic sanitation systems have a bearing on all those characteristics. Similarly, it is often essential for the project to assess any negative impact on the basis of those evaluations to then bringing forward measures to deal with them.

For a proper preparation of environmental evaluations vis-à-vis environmental permits to execute the project, and the most expeditiously as possible approval of those evaluations, the proposed drinking water and basic sanitation project should include a detailed description of the project characteristics. This will prevent the environmental authority from rejecting such evaluations, if considered to be incomplete. This situation can be avoided in most cases if the project developer provides clear and detailed information about the project to be undertaken.

A proposal for environmental and social measures to be undertaken to prevent, mitigate, and control a project´s negative impacts is part to the standard contents of an Environmental Impact Assessment. As such, and other than the usual measures regarding impacts on drainage, topography, soils, vegetation, wildlife, surface and / or groundwater, historical, paleontological and / or archaeological heritage, cultural and natural protected areas, and any other areas in socioeconomic terms, drinking water and sanitation project developers should bear in mind that projects of this kind generally entail that measures should be formulated on issues such as follows:

6.4.1 Water sources management

A drinking water and basic sanitation project should exercise all actions, from the planning and design stages up to abandonment, to ensure the steady production, the proper volume, and best possible quality untreated water. Actions being undertaken to protect water sources can be encompassed within the following general categories according to the place of application: i) upstream waters from the uptake site; ii) water uptake site itself; and iii) on-site disposal of effluent from water treatment processes.

In drinking water and basic sanitation projects to be submitted to CAF for financial consideration, drinking water and basic sanitation project developers should be fully aware that a water source is only the site where the pipeline is installed to carry the untreated water up to the treatment plant for urban centres of a given size, or to some rural water treatment system, provided they are surface water sources. Untreated water is the basic material for water purification systems. This untreated water is originated as a result of natural phenomena sometimes some kilometres away from the water uptake site feeding the system.

Therefore, project developers should make every effort to evaluate the environmental and social conditions of the watershed supplying untreated water for further purification. This evaluation should include forecasting on the basis on future scenarios, and the application of an appropriate predictive model on changes likely to occur in the project area in terms of climate, hydrology, land cover, human settlement, and economic activities.

Information should be included on local and / or regional climate trends as current information available, and the scale of work so avails. Thus, the project shall become more resilient to climate change by bringing forward changes likely to arise in the medium- and long-term vis-à-vis the provision of untreated water, basic raw material to ensure supply of drinking water to the population and, therefore, those trends could be reflected upon the design and subsequent execution and operation of the project.

Analysis and forecasts related to the upstream watershed supplying untreated water should be taken into account in the planning and design stage (incorporating them into the scope of the environmental and social evaluation): related actions could then be implemented over the project execution, operation and maintenance phases.

Drinking water and sanitation projects having a potential impact on the environmental and social stability of watershed catchment site should consider the following particulars, among others:

- Geological (e.g., seismicity, volcanism), geomorphology and soil characteristics (e.g., erosion ability, landslides mass)
- Climate characteristics (averages and extremes), with a focus on rainfall and evaporation;
- State of vegetation (vegetation)
- Land use type and intensity, with an emphasis on productive activities involving the potential affectation of water (e.g., mining, oil and gas activity, agricultural production)

• Hydrological and hydraulic characteristics of surface water and groundwater (e.g., flow, direction, retention time, dilution capacity)

• Water quality (physical-chemical and biological)

• Future projections of the above, in the light of possible regional / local climate change.

Depending upon the environmental and social state of the upstream watershed supplying water, and projections being shown in the modelling tool, an inter-institutional cooperative work strategy should be defined with local authorities, users and all other stakeholders living in the same basin area. Such a strategy shall be focused on the recovery of degraded natural areas, with a particular relevance on the water cycle, or on the full protection of those areas, and should revolve around the sustainability of the manifold services the watershed produce, including the generation of quality untreated water and availability needed as regards water volume and consistency.

Sometimes the untreated water intake for further purification is done in protected natural areas or in sites close to them. Usually, surface water sources having better volumes, seasonal availability and water quality, are those originating in ecosystems being sheltered by those protected areas. In these cases, it is also important to undertake joint actions towards preservation and / or enhancement of untreated water producing ecosystem sources. In this particular case, counting on the coordination and approval of the competent authority responsible for management of the protected area involved.

Beyond the environmental and social bearing that the protection of untreated water sources involve, an effective watershed management will result in reduced treatment needs, allowing, in turn, to minimising operational and maintenance costs, and generating treatment by-products.

Whether the water is being obtained from surface and groundwater sources, project developers should be aware of the catchment or local aquifer characteristics, and determine and control situations likely leading to water pollution. If the catchment management is not within the direct or exclusive competence of the drinking water supplier, the project should reflect the rationale and the commitment to foster a sense of shared responsibility for management of the watershed, through interaction with governing bodies and other users.

Deep groundwater and confined aquifers are usually chemically stable and safe from a microbiological point of view, provided they are free from direct contamination. Shallow or unconfined aquifers may be exposed to pollution from discharges or leaks due to agricultural activity, drainage networks, and local sewage and / or industrial waste. This is the reason why drinking water and basic sanitation projects should bear in mind

environmental and social risks being implied on the watershed supplying the untreated water and / or receiving treated water discharged. These risks are summarized as follows:

• Quick untreated water quality changes;

• Sewage systems and septic tanks discharges;

• Industrial discharges;

• Applying chemicals (fertilizers and biocides);

• Accidental volume spills and routine discharges, or significant physicochemical characteristics (including roads and transport routes discharges);

• Recreational activities;

• Cattle breeding:

• Land uses or land use changes;

• Intake of sediments due to loss of vegetation cover and increased soil erosion;

• Currents and storm water discharges;

• Landfills and mines (improperly disposed of hazardous waste);

• Geological factors (naturally occurring chemicals, including radioactive compounds):

• Severe climatic variations, seasonal or not;

• Depletion of reservoirs;

• Changes in flow rate exceeding the design limits of the water treatment plant, or wastewater treatment plant;

• Inadequate or insufficient treatment operations;

• Poor maintenance of operations control systems;

• Excessive dosage of chemicals to address the lack of efficiency of purification or cleansing equipment;

• Natural disasters.

6.4.2 Natural Disasters Risk Management

A high exposure to natural phenomena, whether of geological or meteorological origin, in an economic and social vulnerability setting, can eventually lead to disaster, involving human life and material losses. Disasters often destroy or substantially affect infrastructure investments accruing over decades, thus worsening inequalities and affecting the pursuit of sustainable development.

Infrastructure and equipping drinking water and sewage systems are not immune to the risk of disasters. When disaster risks become apparent, they may partially or totally affect the operation of those systems, restricting or eliminating access to drinking water, or management and treatment of household wastewater. Therefore, such systems should be ready to deal with these risks, even if they are located in areas showing lower exposure or vulnerability to natural disasters.

The conceptual framework on threats, vulnerabilities, risks, and disasters should be based upon a comprehensive disaster risk management, and not only on a concern to deal with emergencies as they arise. Such management seeks to foster the risk and development link, to increase sustainability of development processes linked to the drinking water and basic sanitation sector. Risk management is aimed at transforming pre-existing risk conditions in order to gradually reduce the occurrence of possible disasters, hence threats should be characterized and measured, and vulnerability conditions should be identified, looked into and understood, so as to minimising the likelihood of a disaster.

From its identification state, a drinking water and basic sanitation project should have a risk management focus, starting by the project´s geographical location. Provisions as follows are suggested, according to each project stage:

Planning and Design

The potential disaster risk in the area selected for the project should be looked into at this stage, bearing in mind specific threats in the region, and the conditions making the project area vulnerable. The first allows to become aware of the area´s own natural characteristics and the occurrence of natural phenomena likely to become into disasters, while the second allows to assess local capacity in terms of preventive and reactive response to disasters and local socioeconomic and institutional characteristics.

Furthermore, information will be forthcoming whether the project is resilient to the occurrence of disasters, and whether or not the project may negatively influence the risk setting in the area where the project is intended to be located. A Rapid Risk Assessment should be conducted at this time by the project´s own staff responsible. In the case assessment findings are negative, a Detailed Risk Assessment should be conducted, this time by specialized staff. This assessment shall look into threats likely affecting the project, those likely being generated by the project itself, delimitation of likely affected areas, the size and scope of threats, probability analysis, detailed analysis of vulnerability and responsiveness of the area, and the potential for post-disaster recovery.

Such a risk assessment shall allow for mitigation and prevention measures needed to deal with threats identified to be defined, taking into account vulnerabilities, as applicable.

Project Execution / operation and maintenance

A regular monitoring of risks and implementation of risk reduction measures as a comprehensive part of the monitoring process shall be ensured over this stage. Regarding projects already implemented, or under way, the vulnerability system should be examined and adaptation options and risk mitigation measures should be identified. Also verification should be made that mitigation and prevention measures being foreseen over the project planning and design stage have been implemented and are effective, thus providing resilience to the project.

6.4.3 Water Quality

Pollution of water for human consumption, or water being discharged by human activities, is originated on a serious of sources and may negatively affect ecosystems functions, the quality of life of the population in general, and people morbidity and mortality in particular. Pollution causes include the chemical and biological quality of groundwater, surface water, industrial effluents, domestic sewage and rainwater. Human activities often leading to those causes are, among other:

- Mining (tailings and acid drainage from abandoned sites);
- Agriculture (fertilizers and biocides);
- Industrial (hazardous waste);
- Domestic (drinking water and domestic origin wastewater management);
- Urban (storm drainage, sewerage and solid waste); and
- Livestock (organic load and microorganisms);

Main diseases related to treated or untreated water consumption, body exposure to that water, are related to the ingestion of viruses, bacteria, protozoa and worms, or skin and mucous membranes´ contact with such biological agents.

Bearing in mind the above, drinking water and basic sanitation projects, in particular water treatment plants and domestic wastewater treatment plants projects, should enforce implementing quantitative assessment programmes dealing with untreated water quality, drinking water, wastewater, and relevant processes effluents.

Only by becoming duly aware of the behaviour of the physical, chemical and biological parameters of all the above waters, and applying corrective actions as required, shall the drinking water and basic sanitation project be able to ensure provision of quality services which are reliable to the population, attesting compliance with environmental regulations in force. According to each case, the project shall review legislation and technical standards addressing assessment of water quality.

Untreated water

An on-going quality evaluation of untreated water entering the water treatment plant should be undertaken by the project because of two main reasons: First, because depending upon the water composition, treatment processes will be more or less efficient and cost-effective. Second, once water composition has been established, a decision could be made as what is required over the purification process to obtain safe drinking water at the end of the process.

Drinking water

Quality of drinking water from the treatment plant to be supplied to the population for consumption should be checked by the project on an on-going basis. Consumer health is dependent upon water composition as regards avoiding morbidity due to the intake of chemical substances the consumption of which should be avoided, or the concentrations of which exceed standards in place, or virus, bacteria, protozoa and worms.

Wastewater

The project should regularly check quality of domestic or combined origin wastewater entering the treatment plant in order to optimize treatment processes, and have access to referential quantitative data to measure efficiency of processes involved.

Purified Water

The project should regularly check quality of treated water from the wastewater treatment plant for their final disposal into the receiving medium. Thus, the project shall ensure compliance with regulations as applicable, having the least possible impact on the receiving site, and significantly reducing the negative impact that wastewater would have on the environment if they had not been treated.

Operation Process effluents

The project should regularly check quality of effluents resulting from a water treatment plant operation and, even more so, effluents from a domestic wastewater or combined origin wastewater treatment plant. While the role of both plants is to produce drinking water or treated water, respectively, at the output of each type of plant, such as by-products of industrial purification and treatment processes, effluents are generated having some potential pollution on the setting receiving them and acting as a final disposal site. In the first case, the effluent is poured into a separate drinking water stream, while, in the second case, the effluent is mixed with the purified water.

6.4.4 Water testing laboratories

Drinking water and basic sanitation projects should incorporate the operation of specialized water-testing laboratories, duly certified and registered under the competent environmental authority. This, other than providing high-quality test results, shall allow acceptance of regular reports on drinking water, purified water, and relevant water effluents quality by environmental authority.

Performance of such laboratories should be taken into account by operation and maintenance stages, in the case of regular evaluation of untreated and treated water, drinking water, wastewater, while Baseline Studies, Environmental Impact Assessments and Environmental Audits may take place when required, in which case the latter would be required in one or more of the planning and design, execution and abandonment stages of the project.

6.4.5 Use of treated wastewater

Over the planning and design stages, drinking water and basic sanitation projects should be aware that, regarding water treated by domestic or combined wastewater treatment plants, in some countries, and pursuant to certain conditions and controls, treated wastewater may be used for some other purposes instead of directly pouring the water into the final disposal site.

When circumstances are in place, projects should raise and discuss the use of these wastewater for irrigation of green areas (on or off-site treatment plant facilities) or for some processes at other facilities as long as these wastewater applications are compatible

with environmental legislation in force regarding wastewater uses allowed, permissible physical-chemical and biological quality, and sites / activities authorized to harness them. If feasible, the project shall implement actions as required over the operation and maintenance stage, thereby contributing to an upgraded use of water resources.

6.4.6 Management of depleted sludge

When domestic or combined wastewater treatment plants are involved, the environmental evaluation of a drinking water and basic sanitation project likely to be executed shall provide for the environmental feasibility of recycling the spent sludge from sewage treatment processes in applications such as improving the nutritional conditions of soils dedicated to certain types of agricultural activities, if possible to do so, pursuant to legislation in certain countries and under relevant environmental and health controls.

If recycling were not possible, the project assessment shall look into alternatives for the final disposal of depleted sludge in safe sanitary conditions, in accordance with environmental regulations as applicable.

6.4.7 Greenhouse Gas Management

Greenhouse gases -methane in particular- are generated from the operation of households or combined wastewater treatment plants. Drinking water and basic sanitation projects for which finance would be sought from CAF should incorporate alternative uses of these gases as a by-product of purifying processes, in their planning and design stage, and therefore, in their relevant environmental evaluations.

The use of greenhouse gases being generated in these plants would qualify as a Clean Development Mechanism endeavour, thus opening the possibility for generating income other than savings in power, and contributing to a global warming reduction entailing the co-generation of electricity on the basis of these gases. In this sense, the project should internalize the possible contribution it could make to climate change mitigation, by preventing greenhouse gases going into the atmosphere.

In this case, the project should make relevant estimates over the planning and design stage, incorporating those forecasts into environmental surveys to evaluate the potential production of these gases, the amount of electricity that could be generated, and designing facilities to harness it in the plant design. The co-generation module would be installed during the project execution phase and later on, over the operation and maintenance phase, the project developer would be able to use the electricity being co-

generated in processes specific to the treatment plant, or sell the electricity being generated to the public power grill, or to local users, as appropriate.

6.4.8 Expropriations, resettlements, and other compensations

In no way whatsoever should works involved in a drinking water and basic sanitation project get under way without first duly solving in a fair and lawful way all processes involving the legal release of properties to be consolidated as the project site. This is usually the case of water treatment plants and / or sewage treatment plants building which, on account of the size of facilities and the types of processes involved, require relatively large land areas.

Identifying properties affected, knowledge of the legal status of ownership, possession, entitlement to each of those properties, together with the social legislation applicable and strategies for due consideration and resolution of each case, should be incorporated into drinking water and basic sanitation projects environmental and social evaluations and, therefore, this applies to the project planning and design stage. However, quantification and final negotiations on these subjects usually take place at the interface between the planning and design and execution stages.

6.4.9 Impacts on daily life, and complaints and grievances management

Over the execution phase of the drinking water and basic sanitation project, some activities are usually implemented, such as the operation itself, and noise and / or dust generating machinery and equipment; the temporary closure of vehicular or pedestrian roads, vehicular traffic congestion, performing works at night time, and temporary restrictions of access to homes and businesses to people living near project execution sites, or people passing through the sites or its access ways, complain about the disruption of daily life and the impact on people´s own concerns.

Drinking water and sanitation projects for which finance may be applied for to CAF should incorporate provisions to minimize impacts of this type. Further on, the project should envision the provision of office space so that complaints may be filed by people accordingly vis-à-vis project implementation. In any case, whether the particular complaint is real or unfounded, the project should duly deal with the complaint, solving the situation giving rise to it, or deeming the complaint to be unfounded, as applicable.

These provisions play a key role in drinking water and basic sanitation projects to be located in urban areas, since population density is higher in these areas and the likelihood for complaints and claims increases. Building of water supply networks, collectors and shortcut tunnels involve direct intervention of vehicular and pedestrian pathways. If plants for water purification or sewage treatment are scheduled to be located in urban areas, they may interfere with the daily life of the population near the facility site on which works shall be executed, or during the operation and maintenance state, due the likely generation of offensive odours, in the particular case of domestic wastewater treatment plants.

Similarly, throughout this stage, a grievances and complaints system should be in place to dealing with and solving complaints arising from parties affected by the project.

6.4.10 Closing of operations

Sometimes, drinking water and basic sanitation facilities are to be dismantled and demolished, either because they have been affected by a disaster or for some other reason. In such cases, due attention should be attached to implementing proper measures for the disposal of rubble and other waste generated, according to their nature and the risk they entail (hazardous or non-hazardous waste). Further, once dismantling and demolition works are over, the site where the project infrastructure was standing should be refurbished and recovered on the basis of criteria to match surrounding topography, surface drainage and natural vegetation. In this regard, the abandoned property shall not leave behind any environmental liabilities whatsoever once the abandonment stage has been completed.

Occasionally, and usually motivated by the emergence of environmental liabilities –being due to inadequate environmental management, or an event related to natural disasters and / or operational aspects- which should be duly addressed, some environmental evaluations may also be required over the project execution, operation, maintenance, and / or abandonment stages. Generally these evaluations are: an Environmental Audit, the specific audit phase of which (liabilities identification, evaluation / quantification and sanitation) will depend on the existing problem, the decision the environmental authority may make regarding the liability concerned and / or the degree of environmental commitment the project developer may have.

Small drinking water and basic sanitation projects, in particular those located in faraway rural areas with little human population to be served, do not usually require such assessments. However, environmental and social provisions applicable shall be considered by the project, notwithstanding, to promote project´ sustainability.

Moreover, and depending upon the type of project concerned, or its location, there is a likelihood that CAF may request for an additional environmental and social evaluation other than that enforceable under the law. In such a case, and based on the conclusions and recommendations arising from such further study, the project developer should modify the evaluation to accommodate activities as required to enhance the positive impact of the project and its sustainability.

6.4.11 Best engineering, environmental and social practices

Overall, the project should identify, formulate, implement, monitor and redress (if necessary) actions and activities that, together, make best engineering, environmental and social practices towards formulation, design, execution, operation, maintenance and abandonment of drinking water and basic sanitation projects.

They are complementary to the terms, conditions and obligations pursuant to which each project is approved and implemented in harmony with the provisions of the environmental authorisation, if the latter is applicable. The availability of these practices in projects to be undertaken should be verified and, if they are missing, they should be defined and conveniently applied vis-à-vis project-related issues as follows:

- Concessions and permissions
- Identification of the project´s direct area of influence
- Management of field and work fronts
- Handling and disposal of liquid waste and rainwater
- Earthworks
- Disposal of waste material
- Removal and management of vegetation cover
- Blocking trees to protect them from damage, collection and management of scrap and pruning wastes
- Trenching, pipe fitting and accessories
- Protection of water sources
- Implementation of geotechnical protection works
- Road adaptation
- Mobilization of equipment
- Emissions and noise control

- Greening of intervened and conservation areas
- Monitoring and control
- Final cleaning of works
- Operation of water supply systems in a normal situation
- Efficient use of drinking water
- Operation of sewerage systems in a normal situation
- Operation of wastewater treatment systems in a normal situation
- Operation of wastewater treatment systems in an emergency situation

6.4.12 Environmental authorizations

Large drinking water and basic sanitation projects often require environmental permits as a prerequisite to start execution of their works. How much these permits are required, for what projects and under what conditions and restrictions shall be dependent upon the provisions of the environmental legal framework of the country where the project shall be executed.

For a proposed drinking water and basic sanitation project developer requiring environmental authorization to obtain it as expeditiously as possible, the project developer should plan and design the project, incorporating in advance those features corresponding to applicable environmental legislation, together with environmental authority instructions as a part to the technical and administrative initial environmental authorization process.

In other words, insofar the environmental legal framework is duly abode by over the project planning and design arrangement, and due regard is attached to environmental authority requirements, whether by approving terms of reference for environmental and social evaluations, or any other constraints to the approval of the environmental permit, thus shall be time being invested by the project developer to secure such a permit.

Usually, small drinking water and basic sanitation projects do not require environmental permits, but rather building permits and, sometimes, some minor environmental permissions such as tree logging permits, use of water sources or access to public sewage network, for example.

6.6. Environmental and Social Management Plan

A drinking water and basic sanitation project expecting to be granted CAF finance, should have an Environmental and Social Management Plan meeting the forecasts the project has of both components, to be implemented from the start of the project construction stage up to the abandonment phase. All actions to be incorporated as set forth in Section VI.4 "Environmental and social studies" in these guidelines, shall be in some way or another be reflected in the Environmental and Social Management measures.

This ESMP may be compulsorily enforced by legislation and the environmental authority; it can be requested by CAF as a financial entity, or be designed and implemented by the project developer himself / herself on his / her own initiative, according to each circumstance. In any of these situations, the ESMP should include environmental and social measures, the person responsible, and the time to implement them. When the project includes an Environmental Impact Assessment approved by the environmental authority, usually the Environmental and Social Management Plan (or equivalent, according to the country concerned) is an integral part of that assessment.

For the proper implementation of the Environmental and Social Management Plan of a drinking water and basic sanitation project, the budget required to ensure timely and effective implementation of environmental and social measures included should be calculated. The estimate of this budget should be made at the time the Environmental Impact assessment is being drawn up, and the project developer should envisage that works contractors make such budget sufficient and detailed estimations, specifically to implement environmental and social measures works contractors are responsible for.

6.7. Environmental and Social Management of Works Contractors

Contracts being entered into to execute a drinking water and sanitation project works should explicitly include environmental and social obligations work contractors should specifically be responsible for over the time they supply their services to the project developer. In general, these obligations are a subset of the related Environmental and Social Management Plan, since most environmental and social measures are linked to the works construction. This is why this provision corresponds to the project´s construction phase.

Moreover, it is essential to ensure that the project developer ensures human and financial resources as appropriate to oversee the environmental and social management of contractors, as well as to address other measures which by their nature should be directly addressed by the project developer. In case of large projects or projects having a high

potential to adversely impact environmental and social components, external audits of this type should be provided for.

6.8. Corporate Social Responsibility

The Corporate Social Responsibility is a management philosophy the aim of which is to contributing to sustainable development through achievement of social, economic and environmental goals likely to come by as part to the direct or collateral execution of projects, drinking water and basic sanitation projects included. Social responsibility goes beyond corporate philanthropy; it represents greater risks; assists in obtaining the MDGs; and increase company profits.

Access to clean water and sanitation as a fundamental human rights, is essentially a starting point for social responsibility action. This sector handbook is intent on taking into account guidance given by a set of water and sanitation operators in Latin America and the Caribbean, on the basis of concepts and recommendations as set forth in ISO 26000: 2010 Standard: Guidelines on Social Accountability and the United Nations Global Compact Management Model.

ISO 26000:2010 Standard: Social Accountability Guidelines

This Standard provides guidance on core social responsibility principles and subjects to achieve a socially responsible behaviour in private, public and not-for-profit, large, medium or small organisations, operating in industrialised or developing countries. While this standard provides guidance to companies, its implementation does not apply for certification purposes. This standard fosters ethical and transparent behaviour which: a) adds to sustainable development, including health and the welfare of society; b) considers expectations of stakeholders; c) complies with relevant applicable law and is coherent with international behaviour standards; and d) is integrated throughout the organisation and is put into practice in the organisation´s own relationships.

In terms of governance, this Standard involves shareholders, employees and regulators; in working practices, it does so with workers, union and outsourced staff; as to fair operating practices, suppliers, competitors and neighbours; regarding consumer issues, clients and consumers; in terms of the community, civil society organizations and vulnerable groups; regarding the environment, neighbours and future generations; and regarding human rights, workers, neighbours and society.

This Standard is buttressed upon the following pillars:

Moral: as a community of persons, the company is at their service.

Strategic: the proper working of the company is a part to the integrated management of ecosystems.

Proactive: Corporate Social Responsibility generates virtuous cycles and maximizing the positive impacts of the company´s management.

Reactive: adaptive answers to environmental demands and negative impacts are minimized.

A drinking water and basic sanitation project should consider whether to voluntarily adopt the philosophy, actions and recommendations contained in this ISO Standard, embodying it in the relevant environmental and social evaluation (planning and design stage) and then on to the operation and maintenance stage, to apply the demand of such a study, or incorporating it into the actions of those projects for which environmental and social assessments are not enforceable.

This recommendation is based on the fact that drinking water collection, treatment and distribution systems in particular, as well as collecting, handling, treatment and disposal of domestic sewage systems are highly relevant to public opinion, because of the basic services those systems supply to the population and their bearing on health and quality of life.

United Nations Global Compact Management Model

The United Nations Global Compact is a voluntary business accession initiative, according to which companies commit themselves to align their strategies and operations into four thematic areas: Human Rights, labour standards, the environment and anti-corruption. Drinking water and basic sanitation projects may be designed and executed by applying this Social Responsibility model which is structured in steps as follows:

Commitment: the incorporation of Corporate Social Responsibility in the company´s strategy, culture and daily operations.

Evaluating: risks and opportunities in financial and non-financial terms, as well as the on-going impact operations and activities have on thematic areas to develop and refine objectives, strategies and policy.

Defining: Specific context objectives and indicators based of risk assessment, opportunities and impacts, and design of a work plan to carry out the programme.

Implementing: On-going adjustments to routine and key processes, involving and educating employees, capacity-building and resources, and working with value-chain partners to address and implement the company´s sustainability strategy.

Measuring: Monitoring and interpreting the company´s own impact and progress towards objectives being sought after.

Communicating: Documenting Company´s impacts and progress for stakeholders.

Overall guidelines to be considered in drinking water and basic sanitation projects with a Corporate Social Responsibility vision are summarized as follows:

Governance

Drafting up ethical management systems

Human Resources

- Capacity-building
- Health insurance
- Occupational Health and Safety
- Termination benefits programme, or pre-retirement training
- Family Financial Planning Programme
- Family support programme
- Volunteering Programme

The Environment

- Energy efficiency
- Use of alternative renewable energy
- Assessment and reduction of carbon footprint in particular, and the ecological footprint
- Watershed protection and conservation of water sources
- Environmental education and water care
- Management of sludge and gases produced by the company operation
- Water Recycling

Community

- Community development programme where the operation is having an impact
- Local employment creation
- Labour inclusion of vulnerable groups
- Cultural promotion

Users and customers

- Attention to settlement populations near the project area
- Application of preferential tariff systems for socially vulnerable sectors
- Incentive of Corporate Social Responsibility best practices for purveyors

In drinking water and basic sanitation projects management is required concerning:

1) Company Top Management support and leadership towards a Corporate Social Responsibility policymaking and enforcement.

2) Warranting an ethical and transparent behaviour in decision-making.

3) Continued commitment to changes or replacement of senior management.

4) Communication and effective internal and external education.

5) Incorporation of Corporate Social Responsibility across the board in strategic planning and corporate management model, linked to quality management and risk management.

6) Adoption of a methodology (e.g., ISO 26000) to customise projects, to generate processes and indicators, and managing for results.

7) Measurement of impacts and drafting up social reports to monitoring the strategy (for example, annual sustainability reports).

8) Adhesion and credibility of company employees as a key part to Corporate Social Responsibility success (nesting in organizational culture).

9) On-going incorporation of stakeholders in designing processes having an impact on the environment and / or society.

10) Promotion of actions going beyond the obligations strictly related to compliance with legislation (e.g., code of ethics, social education, volunteerism, environmental policy).

11) Consideration of social demographic trends, poverty, and ecological margin so as to identify opportunities and challenges for water and sanitation operators.

As previously stated regarding the voluntary adoption of ISO 26000 Standard, a drinking water and basic sanitation project should consider whether to voluntarily adopt the United Nations Global Compact initiative, over the same stages and with similar benefits, and with a view to achieving sustainability.

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