

The Federal Environmental Protection Au- thority



Integrated Environmental and Social Impact Assessment Guidelines Water Supply

NOT FOR CITATION

This guidelines is still under development and shall be binding after consensus is reached between the Environmental Protection Authority and the Environmental Units of Competent Sectoral Agencies

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Introduction

These guidelines focus on rural and urban water supply projects for human needs. They do not cover water supply for agriculture, livestock, forestry or fisheries, as this issue is discussed in the other sectoral guidelines such as Irrigation, Livestock and Rangeland Management, Forestry and Fisheries.

These guidelines highlight major issues and potential impacts that should be taken into account during the preparation and assessment phases. The appropriate enhancement and mitigation measures should be integrated as early as possible, preferably in the project design.

1. Major Types of Intervention in the Water Supply Sub-Sector

Any types of intervention in the water supply sub-sector shall be undertaken through an integrated water resources management approach. In the case of water supply for human consumption, there are two categories of intervention: (i) rural water supply and (ii) urban and peri-urban water supply.

Rural water supply

Rural water supply can be ensured from groundwater, surface water or rainwater. To meet the demand, the three resources can also be used simultaneously. In general, rural water systems are decentralised and rarely include piped distribution systems. Most often the beneficiaries participate in the development process, assist in the construction of the system and become responsible for its operation and maintenance.

Drilled wells and spring tapings are typical decentralised groundwater systems. Surface water supply systems can include small impoundment works (normally earth dams). Rainwater systems can be supplied by a natural catchment on non-perennial streams or by using cisterns (ranging from buckets and barrels up to closed tanks made of concrete, sheet steel or plastic) with associated intercepting and collecting surfaces (roofs, sealed slopes, etc.).

The predominant method for conveying water between the points of intake and consumption sites is using portable containers transported generally by girls and women or by animal traction.

Urban and peri-urban water supply

Urban water supply systems consist of facilities for meeting the water requirements of urban inhabitants, administrations, businesses and industries. The distribution of the water may be achieved with piped systems or non-piped supply points (e.g. wells).

In general, an urban water supply layout includes the following components:

- intake (wells, infiltration galleries, spring tapings, intake structures, storage basins/reservoirs);
- treatment (e.g. metal removal, disinfection, desalination);
- storage of the treated water;
- transmission system (long-distance supply facilities);
- distribution system (piped network);
- wastewater installations (collection, treatment, disposal).

2. Specific Characteristics of a Water Supply Project

The description and justification of a water supply project shall cover at least the following elements:

- Spatial requirements (right-of-way and other sites required for works).
- Project layout characteristics (including site location map).
- Land tenure and ownership.
- Existing water uses and rights.

- Affected groups (directly or indirectly).
- Resettlement requirements and proposed transition and compensation means.
- Stakeholders' water uses, demands and needs, distance to water points, etc.
- Socio-cultural factors or constraints, such as customs and beliefs.
- Natural and human resources requirements.
- Sources of water and justification.
- Water treatment, storage, transmission and distribution systems.
- Wastewater installations.
- Temporary (during construction) and permanent infrastructures.
- Existing and proposed location of human settlements and public services such as health centres and accident and emergency units.
- Construction activities (land clearing, burning, excavation, blasting, extracting, filling, compacting, waterways crossing, use of heavy machinery, etc.).
- Anticipated liquid, solid (including waste) and gaseous emissions, and sources of nuisances (at construction and operation stages).
- Construction schedules and costs.
- Maintenance works and associated costs.
- Water conservation and management (users organisation, fees/tariffs, revenue allocation, etc.)
- Means of preventing contamination.
- Consultation approaches and participation mechanisms.

3. Major Issues Related to a Water Supply Project

The main issues related to water supply projects can be summarised as follows:

Crosscutting Theme	Major Issues	Relevant or not
Poverty	<ul style="list-style-type: none"> • Economic activity, employment and incomes. • Operations profitability. • Access to benefits for the poor and other vulnerable groups. • Skill and knowledge requirements and education. • Access to drinking water. 	
Environment	<ul style="list-style-type: none"> • Ecologically sensitive areas. • Wastewater and water quality. • Use of water. • Soils dynamics. • Heritage and cultural sites. 	
Population	<ul style="list-style-type: none"> • Quality of life. • Land and water rights and uses. • Water resources management. 	
Health Outcomes	<ul style="list-style-type: none"> • Water related, water borne, water contact and water washed diseases. • HIV and sexually transmitted infections. 	
Gender	<ul style="list-style-type: none"> • Women's workload and time allocation. • Control over land and land use proceeds. • Income-generating activities and available income. • Women's needs and demands. • Women's involvement in decision-making processes. 	
Participation	<ul style="list-style-type: none"> • Participation of affected groups in consultations. • Community involvement in water management. 	

4. Potential Impacts, Enhancement and Mitigation Measures

The potential impacts outlined below are presented by crosscutting theme (one table per theme) to clearly identify the potential interactions between a water supply project and a specific transversal issue. The components considered under each crosscutting theme were selected for their relevance to the particular issue.

4.1 Poverty

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Economy	<ul style="list-style-type: none"> • Increase in local development and employment. • Constraints for water suppliers to meet profitability objectives. • Exclusion of specific groups from water facilities benefits. • Disruption of economic activities, particularly if they represent potential sources of water contamination. • Decrease in water prices for those who were buying from resellers. • Increase in water prices, in particular when no user fees were in place before the project. 	<ul style="list-style-type: none"> • Give preference to local employment (men and women) and local inputs (food, basic material) to the extent possible. • Base profitability projections on conservative revenue assumptions. • Identify why specific groups are not benefiting from the project and adopt corrective measures as required. • Ensure that the poor and other vulnerable groups can continue to safely satisfy their basic water needs. • Take into account the capacity to pay of men and women when determining user fees. • Offer alternative income opportunities to men and women having a limited access to or losing productive means.
Information, education and communication	<ul style="list-style-type: none"> • Development of skills in water conservation and management. • Exclusion of specific groups from the water management processes due to a lack of knowledge. • Lack of training of workers in charge of water system operations/exploitation. • Lack of awareness on the importance of hygiene at water points. 	<ul style="list-style-type: none"> • Assist groups of individuals, men and women, who may lack the capacity to participate in water management processes. • Provide water suppliers and workers, men and women, with the training required to preserve water resources and to offer reliable water services. • Develop and implement a literacy program especially aimed at poor people and women. • Provide education to men and women on hygienic conditions and water conservation, taking into consideration gender roles and responsibilities. • Inform men and women on potential project benefits for the community and identify individual behaviours that would contribute to achieve those benefits.
Access to infrastructures and services	<ul style="list-style-type: none"> • Better access to drinking water. • Decreased pressure on health services due to a reduction in the prevalence of certain diseases. • Increased water demand leading to insufficient services to satisfy basic water needs. • Unreliable water service and/or quality. • Inappropriate water storage facilities causing water contamination. 	<ul style="list-style-type: none"> • Ensure adequate water supply for addressing the effective demands of the host and migrant populations. • Develop alternative options to palliate for service breakdowns. • Establish regular controls and maintenance activities to improve the reliability of the system. • Involve the population (men and women) in the management of new and improved services to ensure their sustainability. • Implement water fees/tariffs and other demand management measures to avoid the wastage of water or over-consumption. • Establish quality control for water supply and storage facilities.

4.2 Environment

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Air	<ul style="list-style-type: none"> • Degradation of air quality by dust and vehicles emissions. • Increase in ambient noise. • Odours from sludge disposal operations. 	<ul style="list-style-type: none"> • Install and operate air pollution control equipment, as needed • Near the residential areas, avoid noisy works after regular working hours. • Maintain vehicles and machinery in good condition in order to minimise gas emissions and noise. • Use dust and noise attenuators such as vegetation hedges along transport corridors in order to minimise noise and the aerial transport of dust. • Recover sludge with lime or earth at disposal sites.
Water	<ul style="list-style-type: none"> • Interruption of surface water flows during construction. • Variation in the level of groundwater table resulting from changes in the drainage. • Contamination of surface and underground water quality by wastewater and hazardous materials, including stored chemicals products used for raw water treatment. • Risk of water pollution as a result of discharge of wastewater and filter-washing waters. • Risk of eutrophication of the water body receiving wastewater discharge. • Over-pumping of groundwater. • Saline intrusion in coastal area. 	<ul style="list-style-type: none"> • Do not hamper drainage of surface water and plan for restoration measures after construction. • Do not establish sewer lines in stream channels. • Plan and set up on-site sanitary facilities for the disposal of wastewater. • Maintain vehicles, machinery and equipment in good condition in order to avoid leaks and spill of hazardous materials (hydrocarbons, chemical products, etc.). • Ensure a safe management of hazardous materials (hydrocarbons, chemical products, etc.). • Take all precautions during the refuelling of vehicles and machinery, and forbid the refuelling near water bodies. • Avoid crossing permanent waterways; if necessary, locate the crossing where the banks are stable and the waterway the most narrow. • Conserve the vegetation along water bodies and near wetlands. • Plan emergency response measures in case of accidental spill. • Favour the recycling of filter-washing waters. • Plan the discharge of wastewater in accordance with the absorbing capacity of the receiving water body. • Adjust the annual pumped water volumes in accordance with the aquifer annual refill.

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Soil	<ul style="list-style-type: none"> • Runoff erosion resulting in sedimentation problems. • Change in the local topography. • Contamination of soils from spilling of hazardous materials. • Landslides and other types of soil movements in the works areas. • Soil compaction and erosion. • Reduction of soil fertility. • Soil destabilisation as a result of excavation. • In limestone areas, risk of soil collapsing due to the creation of underground cavities following groundwater over-pumping. • Risk of soil contamination as a result of wastewater leaks from treatment basins and sludge mismanagement. 	<ul style="list-style-type: none"> • Avoid areas sensitive to erosion. • Carry out the construction works in the dry season. • Favour the establishment of water supply infrastructures on low-productive soils. • Limit the circulation of heavy machinery to minimal areas. • Avoid establishing access roads along steep slopes; instead, locate access roads perpendicularly or diagonally to the slope. • Use existing borrow pits rather than creating new ones; after the works, restore borrow pits by stabilising slopes and facilitating vegetation regeneration. • Stabilise the soils in order to reduce potential erosion. • At the end of construction works, level off the soils and facilitate vegetation re-generation. • Lay down water transmission and distribution systems on surface of adequate support capacity. • Adjust the annual pumped water volumes in accordance with the aquifer annual refill capacity. • Design wastewater treatment facilities taking into account the long term projected volumes of wastewater. • Implement good sludge management practices (e.g. burning, lime application or earth covering) guaranteeing human and animal health protection.
Ecosystems	<ul style="list-style-type: none"> • Encroachment into ecologically sensitive and protected areas. • Draining of wetlands. • Reduction of the biodiversity. 	<ul style="list-style-type: none"> • Design the water conveyance layout and wastewater management systems taking into account ecologically sensitive and protected areas. • Establish a perimeter of protection around water catchment areas and sensitive ecosystems such as wetlands and unique habitats sheltering endangered species. • Minimise the length of work in ecologically sensitive areas. • Minimise the water conveyance layout in forestland. • Avoid crossing wetlands and protected areas.
Flora	<ul style="list-style-type: none"> • Destruction of the vegetation cover. 	<ul style="list-style-type: none"> • Minimise land clearing areas.

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
	<ul style="list-style-type: none"> • Loss of forest products (fuelwood, timber, non timber forest products, medicinal plants). • In case of significant and permanent decline in the fossil groundwater static level, decrease in the vegetation development that could accelerate desertification. 	<ul style="list-style-type: none"> • Recuperate the forest products extracted from land clearing and identify mechanisms to distribute the products to the local population. • Protect trees from machinery along right-of-way. • Restore the vegetation in cleared areas. • Ensure the plantation of indigenous species. • Promote the development of community nurseries, preferably operated by women.
Fauna	<ul style="list-style-type: none"> • Disruption of wildlife habitats and migration. • Degradation of aquatic wildlife habitat due to water contamination. • Increase in poaching due to non-resident workers. • In case of significant and permanent decline in the fossil groundwater static level, disruption in wildlife habitat. 	<ul style="list-style-type: none"> • Design the water conveyance layout and wastewater management systems taking into account wildlife reproduction areas and migration corridors. • Do not carry out any work in reproduction areas during the reproduction periods. • Minimise sedimentation in spawning grounds downstream. • Control illegal fishing and hunting, in particular by non-resident workers.
Natural and cultural heritage	<ul style="list-style-type: none"> • Change in, encroachment, destruction or degradation of sites of cultural, archaeological or historical importance. 	<ul style="list-style-type: none"> • Before construction, carry out an archaeological survey of the project area. • In case of discovery of any artefact of cultural, archaeological or historical importance, protect the concerned areas during construction and contact the relevant authorities. • Involve traditional authorities in monitoring cultural, religious, historical and aesthetic sites and resources during the various phases of the project.

4.3 Population

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Demographic trends	<ul style="list-style-type: none"> • Decrease in the mortality rate, particularly for children, contributing to increasing life expectancy. • Increase in the population due to migrants attracted by new economic opportunities (water-using industries, trade) and a better access to drinking water. • Increased ethnic diversity after migration. • Temporary imbalance between men and women due to the arrival of male workers, which can lead to an increase in sexually transmitted diseases. 	<ul style="list-style-type: none"> • Work closely with host communities to facilitate the integration and acceptance of migrants (men and women). • Establish labour camps at a reasonable distance from villages. • Whenever possible employ women or married men with nearby families. • Assist non-resident workers in order to encourage their families to join them.
Migration and resettlement	<ul style="list-style-type: none"> • Decreased standard of living for involuntarily displaced people (likely few people). • Inappropriate living conditions for non-resident workers. • Population pressure due to the arrival of non-resident workers and migrants attracted by new economic opportunities. • Unplanned human settlements. 	<ul style="list-style-type: none"> • Minimise resettlement by negotiating rights-of-way rather than proceeding with expropriations. • Provide equivalent or better housing and accompanying facilities to involuntarily displaced men and women in accordance with consultation results, prior to taking possession of their land. • Plan adequate settlement areas with appropriate housing and services (water and sanitation) and food supply for non-resident workers and their families. • Provide complementary training /support to men and women to facilitate adjustment during the transition period. • In accordance with priorities of displaced men and women, ensure appropriate funding for resettlement and compensations, in particular for productive land owned, occupied or cultivated. • Establish access mechanisms in order to control unorganised settlements.
Natural resources and land management	<ul style="list-style-type: none"> • Sustainable management of water resources. • Improvement in water resources conservation. • Perturbation in land and water uses, which can lead to social conflicts. • Rivalry associated with incompatible uses upstream and downstream of the water supply source/system. 	<ul style="list-style-type: none"> • Design the project and coordinate work with the various land users (men and women). • Consult all groups of the population using water and/or discharge potential contaminants in water (surface or underground). • Clearly define water rights in consultation with affected groups, ensuring the participation of women and men. • Ensure that water user fees and conditions are defined in consultation and well un-

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
	<ul style="list-style-type: none"> • Loss of or limited access to territory for some groups, particularly farmers and livestock herders. • Reduction in the quantity of water available for other uses. • Increased pressure on natural resources due to migration. 	<p>derstood by all concerned stakeholders.</p> <ul style="list-style-type: none"> • Create water supply system management committees. • Build on the respective knowledge and experience of women and men in water management. • Restore productive lands into initial conditions. • Plan water intake according to available water resources.
Quality of life	<ul style="list-style-type: none"> • Improvement in the quality of life due to better water supply and new economic opportunities. • Disruption of quality of life due to nuisances such as noise, dust and traffic related to construction works. • Degradation of the landscape by land clearing, construction works, new infrastructures, etc. • Deterioration of hygienic conditions caused by increased wastewater quantities (odours, overflow, etc.). • Social conflicts due to the venue of non-resident workers and migrants (divorces, ethnic tension, etc.) 	<ul style="list-style-type: none"> • Involve men and women in the maintenance and management of new infrastructures to ensure their sustainability. • Provide information and education on monitoring and maintaining water supply systems, particularly for ensuring water quality preservation. • Establish a formal consultation mechanism with local authorities to discuss issues disturbing inhabitants and to find solutions satisfying all parties. • Implement a communication plan to inform men and women on project activities and potential nuisances. • Involve local authorities in monitoring implementation activities and compensation agreements, ensuring a good representation of men and women. • Use an architectural design integrating the new infrastructures into the landscape. • Plan wastewater management as part of the project. • Ensure appropriate support from social services to facilitate the transition and to prevent conflicts within families or among groups.

4.4 Health Outcomes

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Communicable diseases	<p>Changes in exposure to:</p> <ul style="list-style-type: none"> • Water borne diseases e.g.: diarrhoea and cholera associated with contamination, intermittency and poor sanitation. • Water related diseases e.g.: malaria, filariasis, dengue associated with drainage, storage and wastewater disposal. • Water contact diseases e.g.: schistosomiasis and swimmer's itch associated with impoundment. • Water washed diseases e.g.: scabies and skin infections associated with insufficient supply. • Sexually transmitted infections e.g.: HIV/AIDS associated with migration, construction, economic change. • Respiratory infections e.g.: TB associated with crowding. 	<ul style="list-style-type: none"> • Provide information, education and communication about safe uses of drinking water. • Facilitate the implementation of appropriate latrines and other sanitation facilities. • Environmental management for vector control; contact avoidance via settlement location and design and use of bednets and repellents; rapid diagnosis and treatment; focal insecticide and molluscicide application; covered water storage; reduced domestic storage; functional drainage. • Strengthen medical services to ensure rapid diagnosis and treatment. • Ensure safe water and food storage and handling. • Implement HIV/AIDS prophylaxis for men and women through appropriate health promotion as well as wide distribution and use of condoms; employment opportunities for project-affected women; provision of family accommodation for workers. • Assure continuous supply. • Avoid using contaminated groundwater and unauthorized connections. • Avoid contamination via runoff and contamination of intake and storage equipment, particularly through users' education and workers' training. • Ensure piped supply is accompanied by appropriate wastewater drainage and disposal. • Project settlement housing designed to avoid crowding, and provide ventilated kitchens and efficient stoves. • Refer to measures proposed under Environment and Poverty crosscutting themes as they address many health determinants of communicable diseases.
Non communicable diseases	<ul style="list-style-type: none"> • Poisoning associated with excess chemicals (e.g.: fluoride, nitrite, arsenic, chlorine). • Diseases associated with chemical deficiencies (e.g.: iodine is associated with goitre and cretinism). 	<ul style="list-style-type: none"> • Monitor water quality and adjust chemical content as appropriate.
Injuries	<ul style="list-style-type: none"> • Increased risk of accidents on working sites and roads due to increased traffic. • Work injuries. 	<ul style="list-style-type: none"> • Develop, communicate and implement safety and preventive measures for the population (such as traffic calming devices). • Control access to working sites.

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
		<ul style="list-style-type: none"> • Install and maintain appropriate signs. • Plan stabilisation and evacuation of injured. • Plan for accident and emergency facilities. • Develop, communicate and implement safety and preventive measures for workers (men and women). • Plan equipment for moving heavy loads such as donkey carts and ergonomic equipment for men and women.
Psychosocial disorders and well-being	<ul style="list-style-type: none"> • Stress and anxiety associated with involuntary resettlement, rapid social change, loss of traditional authority, loss of spiritual assets, uncertainty and locus of control, severance, exclusion, marginalisation, gender related problems and domestic disputes leading to suicide, physical and mental abuse, child marriage, labour and sale, and communal violence. • Well-being associated with improved services, stability, work opportunities, settlements, health, empowerment, education and training. 	<ul style="list-style-type: none"> • Refer to measures proposed under other crosscutting themes as those address many causes of psychosocial disorders and factors contributing to well-being.

4.5 Gender

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Division of labour (paid or unpaid work)	<ul style="list-style-type: none"> • Reduced time allocated to water supply by women and children due to more reliable and closer drinking water sources. • Reduced efforts associated with water transportation. 	<ul style="list-style-type: none"> • Provide means to women and children to further reduce efforts devoted to water transportation (donkey, wheelbarrow, etc.). • Plan supply alternatives in case of water system breakdowns.
Income generating activities (money or kind)	<ul style="list-style-type: none"> • Local jobs obtained by women during construction or operation phases. • Increased revenues for women who have additional time for income-generating activities. • Opportunities to increase income and diversify revenue sources through induced development. • Reduced available income for women when user rights and fees represent additional expenses. • Limited participation of women in project benefits due to cultural barriers. 	<ul style="list-style-type: none"> • Offer project employment opportunities to men and women, encourage women to apply and select candidates according to their competencies. • Ensure that women have access to existing and planned facilities to take advantage of new opportunities. • Ensure that women are consulted in determining water user rights and fees. • Ensure that project promoters do not reinforce cultural barriers affecting negatively women.
Access to and control over productive factors	<ul style="list-style-type: none"> • Loss of control over water supply when women are not involved in decision-making processes. • Supply options do not respond to women priority demands. 	<ul style="list-style-type: none"> • Provide men and women with an equivalent opportunity to make their demands known to project decision-makers. • Recognise the specific demands and capabilities of women in water management.
Involvement in societal organisation	<ul style="list-style-type: none"> • Involvement of women in decisions related to water management. • Women get organised to obtain training in hygiene and water conservation adapted to their specific needs. 	<ul style="list-style-type: none"> • Establish committees involving women and men for managing water resources and supply facilities. • Ensure that women are involved in user fee collection and allocation decisions. • Facilitate the creation of women groups when women express an interest in being better organised and represented.

4.6 Participation

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Consultations	<ul style="list-style-type: none"> • Integration of men's and women's concerns into the project design. • Participation of the community, men and women, in project development. • Increased support for the project among affected populations. • Exclusion of specific groups from consultations, particularly women. • Water user fees determined without consultations. 	<ul style="list-style-type: none"> • Consult affected men and women at all phases of the project, including for establishing user fees. • Provide the opportunity to affected groups to participate in the project development process by implementing adapted participation mechanisms. • Use consultations to identify traditional patterns of right and responsibilities concerning water supply and to determine ways to increase the involvement of excluded groups (particularly women). • Inform consulted men and women on how their concerns were taken into account.
Civil society strengthening	<ul style="list-style-type: none"> • Creation of community-based organisations in water management. • Participation of the community, men and women, in the project exploitation through the involvement of community-based organisations. • Expansion of the CSO network working on environmental protection. • Lack of collaboration between new and existing CSOs working on environmental issues. 	<ul style="list-style-type: none"> • Ensure that men and women have the opportunity to organise themselves in groups representing their collective interests. • Transfer to water management community-based organisations the maintenance of the system, including revenue collection activities whenever possible. • Facilitate the participation of existing CSOs in the project taking into account their respective intervention priorities and strengths.

4.2.2 Construction

5. External Factors

The major external factors that may jeopardise the outcomes of water supply projects are the following:

- **Pollution from industrial, domestic, agricultural and animal sources**

Industrial and domestic effluents, as well as pollution from agricultural and animal production, can lead to the degradation of drinking water quality. To minimise the risks of water pollution, it is recommended to adopt an integrated water resources management approach, taking into account the location of potential contamination sources while planning the water supply project.

- **Social Instability**

The emergence of community violence, vandalism, civil war, border raids and boundary disputes are phenomena that generate social instability and can lead to migration, disruption of the food chain, water contamination and intermittent supply, injuries, epidemics and mortality. Good governance and poverty alleviation policies are means to prevent social instability.

6. Hazard Management

The main hazard associated with water supply projects is the following:

- **Water contamination**, jeopardising the potable water supply of the population and increasing the risk of water borne diseases.

In order to prevent or minimise these hazards, appropriate risk management measures shall be designed and implemented.

7. Environmental and Social Monitoring

The following table presents potential indicators that could be used to monitor the implementation of a water supply project. The appropriate indicators for a specific project shall be selected according to the project context, major anticipated impacts and the cost of data collection and processing.

Component	Indicators
Poverty	
Economy	<ul style="list-style-type: none"> Annual revenues generated by water supply operations compared to projected revenues. Number of jobs created (directly and indirectly) and occupied by men and women. Proportion of income spent on water by families before and after the project.
Information, education and communication	<ul style="list-style-type: none"> Understanding of concepts on hygiene and water conservation by trained men and women (survey).
Access to infrastructures and services	<ul style="list-style-type: none"> Number of water points as a function of the population. Distance to the closest water point. Number of domestic water supply breakdowns. Average number of regular hours of services. Change in water user fees. Results of quality control of facilities.
Environment	
Water	<ul style="list-style-type: none"> Groundwater static level and refilling capacity. Parameters of <i>WHO Guidelines for Drinking-water Quality</i> for evaluating water quality at the sources and wastewater discharge sites. Quantity of water used compared to initial estimates.
Soils	<ul style="list-style-type: none"> Evolution of erosion signs.
Ecosystems	<ul style="list-style-type: none"> Surface of sensitive areas affected by the project (encroachment, sedimentation on spawning grounds, river banks erosion, etc.).
Natural and cultural heritage	<ul style="list-style-type: none"> Natural and cultural sites affected by the project.
Population	
Demographic trends	<ul style="list-style-type: none"> Evolution of the mortality rate per age group. Population growth and ethnic composition.
Migration and resettlement	<ul style="list-style-type: none"> Number of informal settlements built by migrants.
Natural resources and land management	<ul style="list-style-type: none"> Number of conflicts among water users. Evolution of water consumption per inhabitant (litre/day). Presence of water user organisations, including men and women. Revenues from water fee/tariff collection and allocation.
Quality of life	<ul style="list-style-type: none"> Level of satisfaction of beneficiaries toward water supply services (survey).
Health Outcomes	
Communicable diseases	<ul style="list-style-type: none"> Prevalence rates of diseases such as malaria, schistosomiasis, diarrhoea and HIV. Outpatient attendance records.

Component	Indicators
	<ul style="list-style-type: none"> Quantity of drugs supplied and used from health services and local shops. Water quality analysis results (coliforms and ascaris).
Non communicable diseases	<ul style="list-style-type: none"> Prevalence rates of poisoning and goitre. Water quality analysis results (mineral excesses and deficiencies).
Injuries	<ul style="list-style-type: none"> Number of accidents on works sites.
Gender	
Division of labour	<ul style="list-style-type: none"> Time allocation of women before and after the project. School attendance of girls and boys before and after the project.
Income-generating activities	<ul style="list-style-type: none"> Proportion of women income devoted to water supply before and after the project.
Access to and control over productive factors	<ul style="list-style-type: none"> Level of satisfaction of women toward project investment decisions and management methods (survey).
Involvement in societal organisation	<ul style="list-style-type: none"> Number of women and men involved in user and/or water management organisations.
Participation	
Consultations	<ul style="list-style-type: none"> Stakeholders' satisfaction toward consultations on user fees.
Civil society strengthening	<ul style="list-style-type: none"> Increase in community-based organisations dedicated to water management or environmental protection. Level of participation of user and/or water management organisations in the decision-making processes.

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