



СЕДРИГ
Оперативный

Construction of a water treatment plant and sewer system for the Guaqui town, Department of La Paz / Municipality of Guaqui

—
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June 2018г.

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and Cooperation SDC

Обзор

Информация общего характера

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|--------------------------|---|
| Contributors | Roberto Méndez, COSUDE-Ayuda Humanitaria, Боливия Daniel Maselli, Swiss Agency for Development and Cooperation SDC, Швейцария Moritz Krüger, Swiss Agency for Development and Cooperation (SDC), Тайланд Michael Fink, Swisscontact Tobias Sommer, SDC, Швейцария GENTIANE SCHWARZER, SDC - DRR Network, Швейцария nadia benani, SDC, Швейцария |
| Общая цель | Improve the current living conditions of Guaquí's inhabitants through the implementation of an appropriate sewage system, benefiting the overall population |
| Страна | Боливия |
| Бюджет | Bs. 7'000'000 (approximately USD 1'000'000) |
| Продолжительность | September 2016 - July 2017 (approximately 10 months) |

Аннотация

Описание Due to the absence of a sewage treatment plant in the Guaqui town, wastewater is discharged directly to Lake Titicaca, causing serious water pollution. Through the construction of a sewage treatment plant, the water pollution will be reduced along with an improvement of the living conditions of the local population. As a result of frequent lake level fluctuations, however, the sewage treatment plant might suffer negative impacts from flooding. In addition, frosts during the cold winter months can affect the plant's components such as (i) the sewage collection system and inspection chambers, (ii) emissary, (iii) pumping chamber, (iv) pressure pipe, (v) treatment plant, and (vi) infiltration ditches.

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|-----------------------|-----------------------------|--------------------------|
| Ключевые слова | Wastewater treatment system | sewage collection system |
| | emissary | water pumps |
| | lake contamination | Bolivia |
| | Floods | frosts |

Сектора, требующие оперативного вмешательства

Водоснабжение и санитария

Документы

Project Information (pdf, 5.24 МБ)

Изображения



Project_Location

General_project_data

Town of Guaqui
Municipality of Guaqui
Department of La Paz
Autonomous Municipal Government of Guaqui
EMAGUA (Executing Agency for Environment and Water)

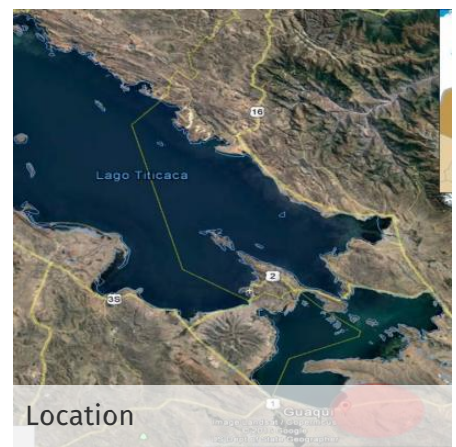
USD. 1.000.000
USD. 901.344
USD. 47.050
USD. 8.100

Objective: to improve the current situation for the people of the Guaqui town by installing an appropriate sewer system for a population currently living in a town with a projection of 20 years

Component: Sewage collection network, Emissary, Pumping sump, Pumping line, Treatment plant, Infiltration ditch

USD. 48.500
Sept 2016 – July 2017
Water and Sanitation
3822 inhabitants

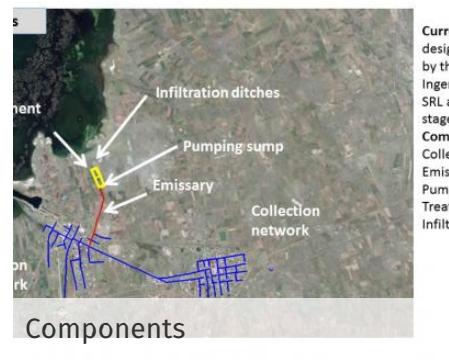
General_project_data



Location



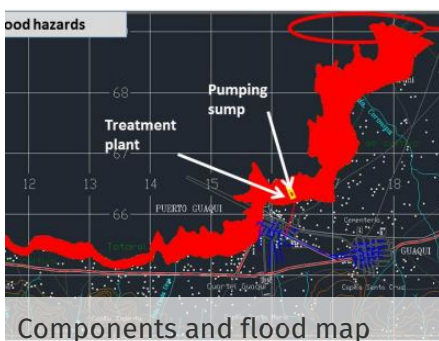
Coverage and extension



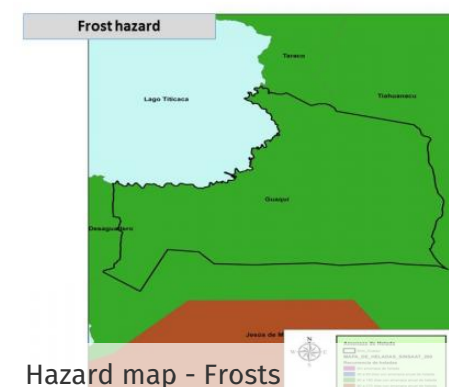
Components



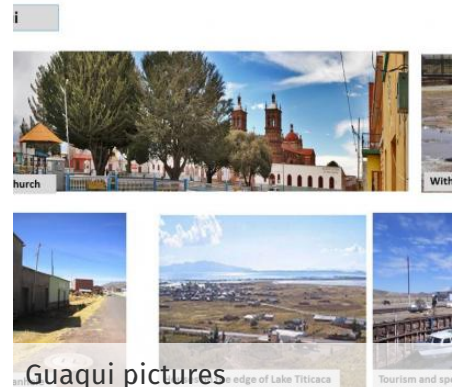
Flood map



Components and flood map



Hazard map - Frosts



Guaqui pictures

Components and flood map

Hazard map - Frosts

Guaqui pictures

Components, plant (oxidation lagoons) and pumping sump



Infrastructure

Infrastructure

Components, plant location, risks, soil types and flood zones



Infrastructure

Infrastructure

Факторы риска

Природные угрозы (гидрометеорологические и геологические)

| Название угрозы | Наводнения, внезапные паводки | | |
|---|---|---|---|
| <p>Последствие</p> | <p>Due to extreme lake level fluctuations, the plant's components could be damaged and filled with sediments. The service would be interrupted. This happens in average every 15 years.</p> | | |
| <p>> Выбранный фактор риска</p> | <p>Тяжесть Чрезвычайно большой ущерб</p> | <p>Степень вероятности Возможно</p> | <p>Значительность Высокий уровень риска</p> |
| <p>Выбранная уязвимость</p> | <p>Disconnected communities, increased pressure on soils and water resources, fragile incomes, relationship between municipality and Risk Management Unit, additional health risks</p> | | |
| <p>Потенциальная мера</p> | <p>Capacity building in DRR for local communities Баллы (необязательно) 3.40 Комментарии The local community has no experience in DRR and should be included in the steering mechanisms (social control) > Выбранная мера</p> | | |
| <p>Потенциальная мера</p> | <p>Strengthen operation and maintainance Баллы (необязательно) 3.20 Комментарии DRR-related aspects were not considered for plant's operation and management > Выбранная мера</p> | | |
| <p>Потенциальная мера</p> | <p>Early warning system Баллы (необязательно) 2.00 Комментарии It is vital to observe the lake level fluctuations as well as the river discharge > Выбранная мера</p> | | |
| <p>Потенциальная мера</p> | <p>It is vital to observe the lake level fluctuations as well as the river discharge Баллы (необязательно) 2.20 Комментарии Dykes to protect the plant's components > Выбранная мера</p> | | |

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| Потенциальная мера | Reduction of river discharge (river deviation) Баллы (необязательно) 1.60 Комментарии Consider structural measures that permit the diversion of inflowing river water |
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Последствие **Due to flood events, the equipment can not be used and/or broken parts have to be replaced**

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| > Выбранный фактор риска | Тяжесть | Степень | Значительность |
| | Чрезвычайно большой ущерб | вероятности | Высокий |
| Выбранная уязвимость | Skills: weak technical knowledge, replacement of spare parts, insufficient access to credits and insurance solutions, lack of ownership of the municipality, emerging local markets and trade | | |

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| Потенциальная мера | Use of water-resistant, robust equipment Баллы (необязательно) 1.80 Комментарии Consider extreme events > Выбранная мера |
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| Потенциальная мера | Risk transfer measures (insurance solutions) Баллы (необязательно) 2.20 Комментарии Taking into account the socio-economic situation of the municipality and the local population, a insurance solution could be appropriate > Выбранная мера |
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Последствие **During a flood event, the wastewater could contaminate the river water and cause health problems for the local population. Due to the topography, contaminated water would flow into the lake and not to the urban zone.**

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| | Тяжесть | Степень | Значительность |
| | Небольшой ущерб | вероятности | Низкий уровень |
| Выбранная уязвимость | Health: health education, social hygiene, health stations, health networks, unprotected water sources, precarious health situation | | |

Название угрозы **Аномально низкая температура**

Последствие **Malfunction of the plant and drastic efficiency reduction of the oxidation basins. 90 to 180 days per year with frosts, 3835m a.s.l., average temperatures of 4°C , minimum temperatures -10°C (on average every 2 years)**

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|------------------------------------|---------------|-------------|----------------|
| > Выбранный фактор риска | Тяжесть | Степень | Значительность |
| | Средний ущерб | вероятности | Средний |

Выбранная уязвимость Operation and efficiency: communities with respiratory infections, lack of maintenance, low technical capacity, frequent interruption of service

Возможно

уровень риска

Потенциальная
мера

Change to appropriate materials

Баллы (необязательно) 2.40

Комментарии Identify materials that support extreme cold temperatures

> **Выбранная мера**

Потенциальная
мера

Heating system

Баллы (необязательно) 1.40

Комментарии Identify a technical solution that allows the plant's operation within the material's optimal temperature range (e.g. heating system)

Адаптируйте свой проект

Multi-criteria analysis of identified measures (xlsx, 13.04 КБ)

Adapted Logical Framework (in Spanish) (pdf, 59.96 КБ)

○ Воздействие

Воздействие на окружающую среду

Компонент проекта Water treatment plant (oxidation basins) and pumping chamber

Потенциальное отрицательное воздействие Bad odors could disturb the surrounding population

Значительность Worsening of the quality of life for the local population and related health issues
> **Выбранное воздействие**

Потенциальная мера **Artificial cover of the oxidation basins**
Баллы (необязательно) 2.00
Комментарии Prevents odor emissions
> **Выбранная мера**

Компонент проекта Location of the water treatment plant

Потенциальное отрицательное воздействие Landscape changes due to the different construction sites

Значительность The water treatment plant could have a negative impact on the number of tourists visiting the Lake Titicaca region
> **Выбранное воздействие**

Потенциальная мера **Land use plan**
Баллы (необязательно) 3.60
Комментарии The water treatment plant can be included in the plan as an element which improves the quality of stay for tourists
> **Выбранная мера**

Потенциальная мера **Change of technology**
Баллы (необязательно) 1.20
Комментарии It would mean substantial changes in the design of the project

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| Потенциальное отрицательное воздействие | The system will require large areas for construction |
| Значительность | The project could have an negative influence on local environmental planning and increase the need for additional human resources of the Guaqui Municipality |

Воздействие на риски бедствий

Компонент проекта Water treatment plant (oxidation basins)

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| Потенциальное отрицательное воздействие | New settlements around the plant in the future |
| Значительность | Structural measures to protect the plant (e.g. through dams) could attract people and lead to new settlements in flood-prone areas > Выбранное воздействие |
| Потенциальная мера | Security strips Баллы (необязательно) 3.20 Комментарии To be included in the territorial plans > Выбранная мера |
| Потенциальная мера | Purchase of land in surroundings Баллы (необязательно) 1.20 Комментарии Acquisition of land to avoid new settlements in flood-prone areas |
| Потенциальное отрицательное воздействие | Exposure of the Guaqui's local population to greater risks from natural hazards and increase of vulnerability |
| Значительность | The planned structural protection measures could lead of a shift of risks more towards the urban areas. Scientific studies estimate a medium risk for this development. |

Воздействие на изменение климата

Компонент проекта Water treatment plant (oxidation basins)

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| Потенциальное отрицательное воздействие | Greenhouse gas emissions from the oxidation basins |
| Значительность | Taking into account the size of the water treatment plant, high levels of GHG emissions can be expected. Even higher emissions are possible during a malfunction of the system > Выбранное воздействие |
| Потенциальная мера | Artificial cover of the oxidation basins Баллы (необязательно) 2.20 Комментарии Storage of gases and burning with appropriate technology > Выбранная мера |
| Потенциальная мера | Carbon sinks (afforestation) Баллы (необязательно) 1.20 Комментарии Reforestation to compensate for GHG emissions |
| Потенциальное отрицательное воздействие | Emission of additional other gases by the water treatment system |
| Значительность | According to studies, the risk of problems arising from additional gas emissions is low in our study area. |

Компонент проекта Power systems of the plant

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| Потенциальное отрицательное воздействие | The generators of the different pumping systems run with diesel causing high emissions of GHG and black carbon |
| Значительность | Taking into account the plant's increasing utilization (close to its limits), the pumping hours will increase in the future along with emissions of GHG and black carbon > Выбранное воздействие |
| Потенциальная мера | Use of alternative energies, energy generation through burning trapped gases from the oxidation basins Баллы (необязательно) 1.60 Комментарии Strong winds in the study area (high potential for wind energy), and solar power > Выбранная мера |

Потенциальная
мера

Connection to the national power supply system

Баллы (необязательно) 1.20

Комментарии This measure would imply the installation power supply lines over long distances

Адаптируйте свой проект

Adapted Logical Framework of the project (pdf, 58 КБ)

Multi-criteria analysis of identified measures (xlsx, 13.04 КБ)