

# Linking Water and Climate

Greenhouse Gas Reductions  
in the Water Sector



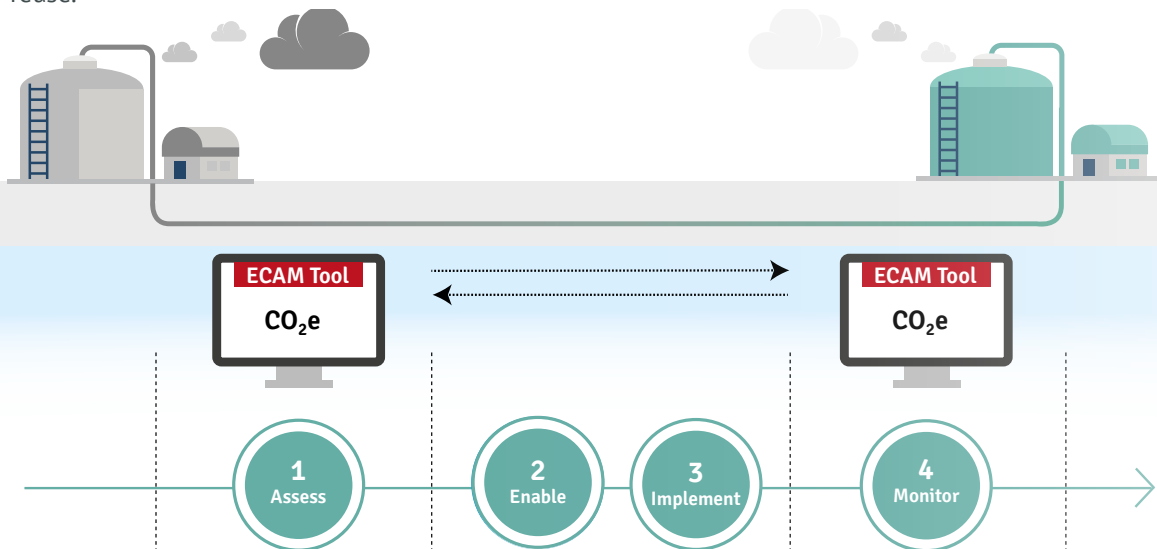
[www.wacclim.org](http://www.wacclim.org)



# Our Goals

The WaCCliM project supports water and wastewater companies to improve their carbon footprint. The project uses a cross-sectoral approach considering the implications of *greenhouse gases (GHG)* in the water-energy-food nexus.

The *Energy performance and Carbon emissions Assessment and Monitoring Tool (ECAM Tool)*, a carbon footprint tool for water and wastewater utilities is a cornerstone to the roadmap. ECAM helps utilities understand their overall energy usage and total GHG missions at system-wide level (drinking water and wastewater) and indicates areas to reduce emissions considering all components of the urban water cycle from water supply, wastewater treatment, sludge management, as well as water reuse.



**WaCCliM - Water and Wastewater  
Companies for Climate Mitigation**

**Objective**

**Reduce Utilities' Carbon Footprint and Accelerate  
Action to Decarbonize the Water Sector**

**Major Measures**

Implement GHG  
Reduction Measures

Strengthen Enabling  
Environment

Build and Disseminate  
Knowledge

**Climate neutral water utilities**

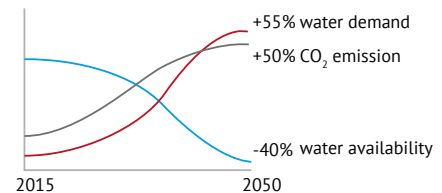
# The Challenge

Limiting climate change to 1,5°C requires substantial reductions in GHG emissions in all sectors. The urban water sector shows under-recognized opportunities to reduce carbon emissions, mitigate climate change and contribute to the successful implementation of the Paris Agreement through increasing the Nationally Determined Contributions (NDCs) of supporting countries.

Global demand for water will increase by **55% by 2050**, while water availability will decrease by **40%**. While the water sector has to cope with the impacts of climate change, it also contributes to **3-5% of global CO<sub>2</sub>e** (emissions) from energy consumption as well as methane and nitrous oxide emissions from wastewater handling. This means that if no appropriate measures are implemented in the sector, emissions could increase by at least 50% in the same timeframe.

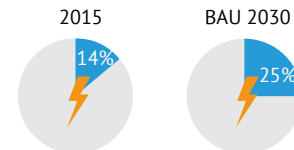
Carbon reduction measures can be put into motion through working with utilities in emerging economies, where emissions are the highest due to a large portion of untreated or poorly treated sewage, as well as poorly managed sewage sludge.

## The water demand is increasing

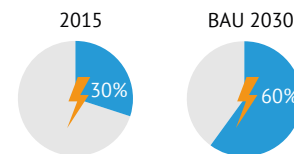


## The water sector is energy intensive in water stressed countries

Gross national energy consumption in relation to energy use for water supply (Example Jordan)

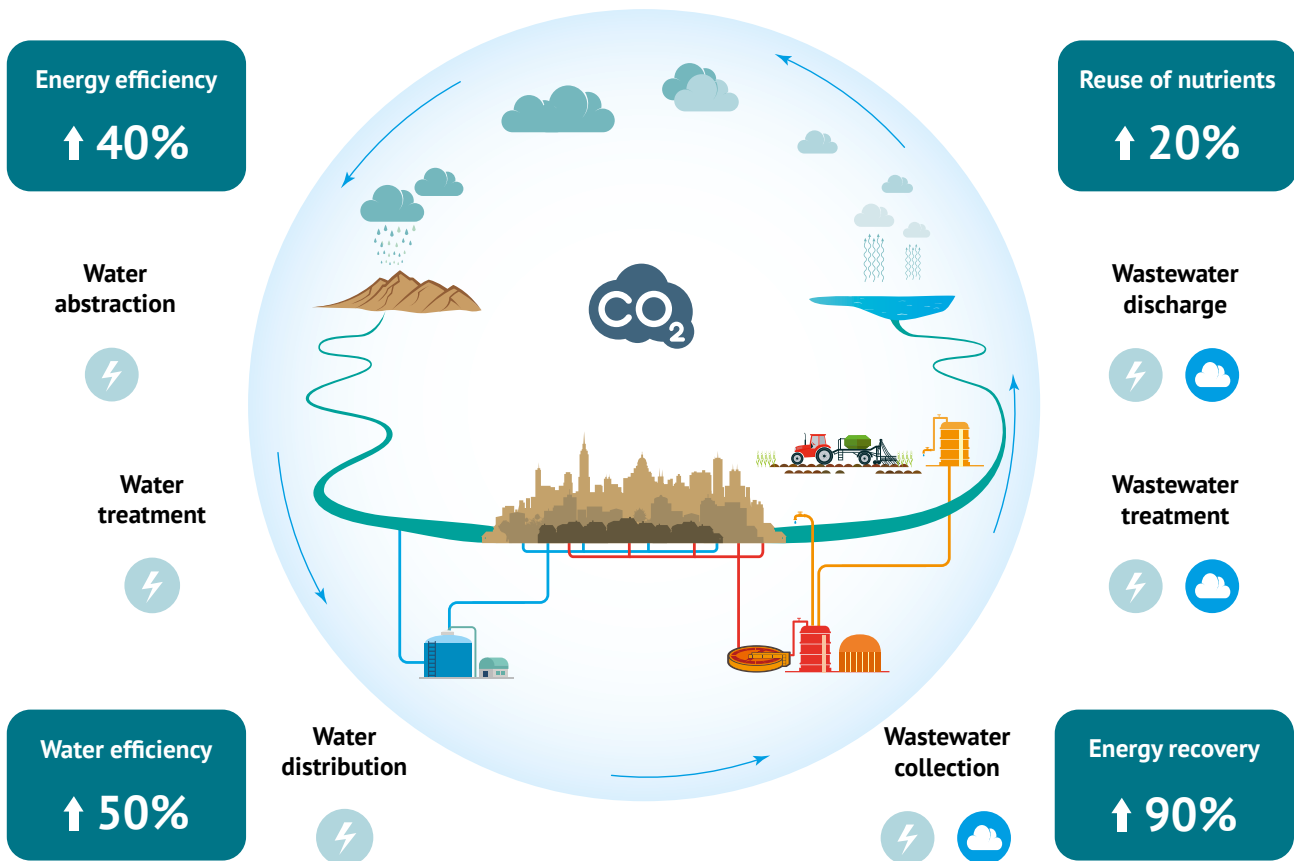


Municipal energy consumption in relation to energy use for water supply



### Urban water cycle and mitigation measures:

The project uses a circular perspective on water management and considers all components of the urban water cycle from water supply, wastewater to reuse of water.



# Where are we working?

WaCCliM is pioneering GHG reductions in the water sector in **Mexico, Thailand, Peru and Jordan**.

The programme offers utilities a roadmap to achieve energy and carbon neutrality. Utilities from more than **20 cities worldwide** have used ECAM in the pilot phase of WaCCliM.



## Mexico:

**12% GHG reduction  
from water systems**

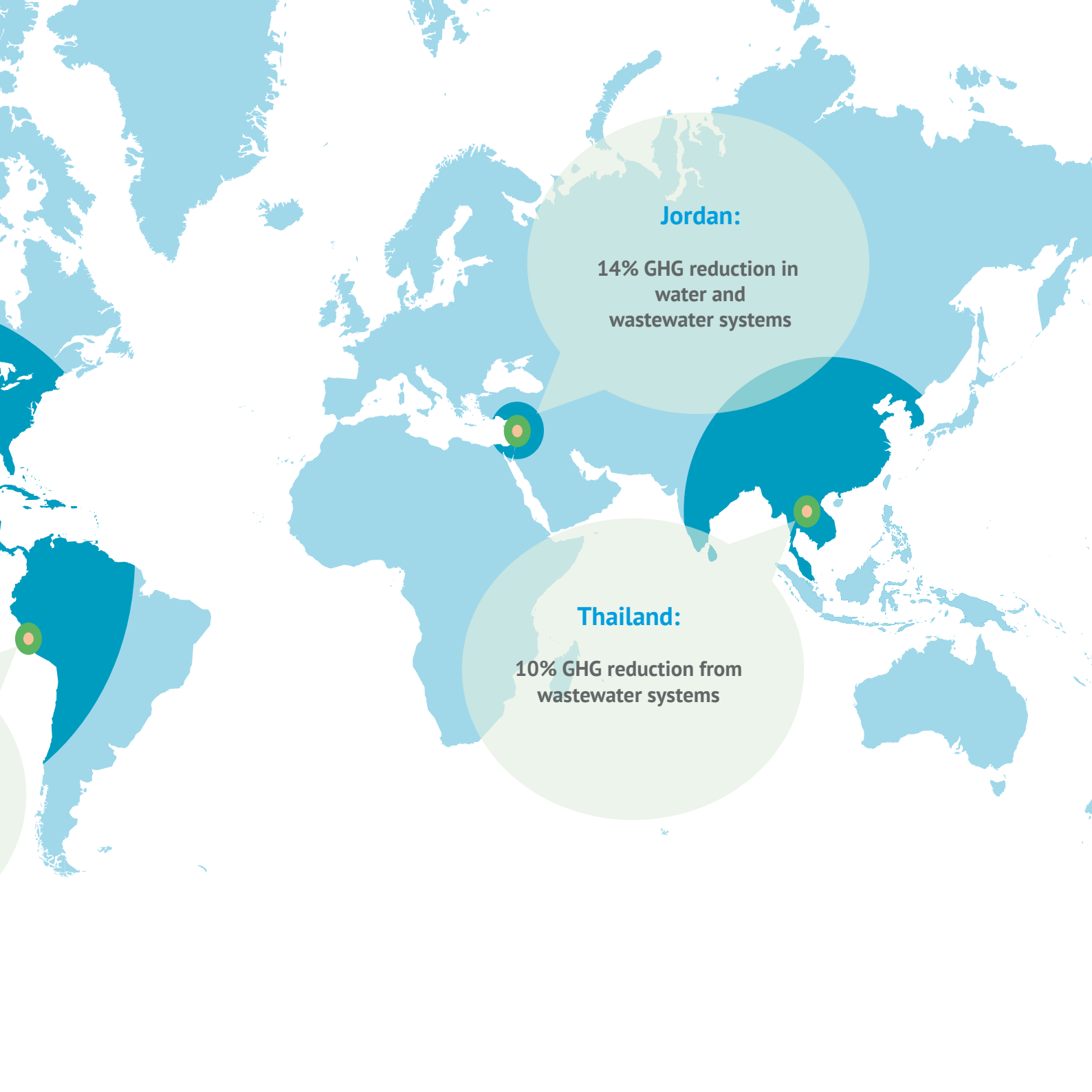
**20% GHG reduction from  
wastewater systems**



## Peru:

**30% GHG reduction  
from water systems**

**27% GHG reduction from  
wastewater systems**



**Jordan:**

14% GHG reduction in  
water and  
wastewater systems

**Thailand:**

10% GHG reduction from  
wastewater systems

# The Impact

## The Solution Mexico

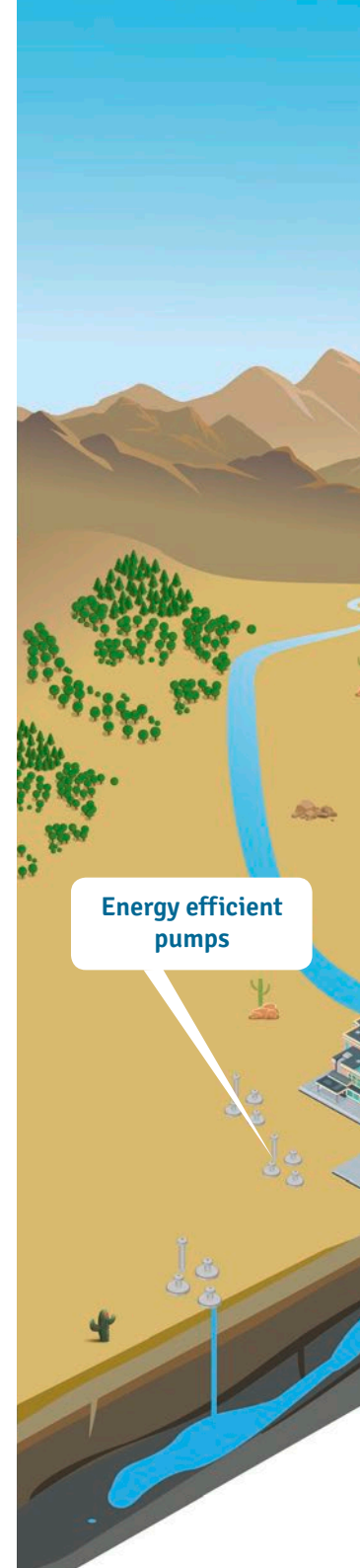
Mexico was seen as a leader during the *Paris COP21* negotiations, it has committed ambitiously to reducing 22% of its GHG emissions by 2030 compared to base-line scenario, with the potential to raise the target up to 40%.

In Mexico, water utilities have a difficult task meeting user's demands. Low tariffs, high water consumption, and a complicated legal framework have led to unsustainable water abstraction, high energy costs, water losses, and inadequate wastewater treatment, which contribute to very high GHG.

The WaCCLiM project is working with the *National Water Commission (CONAGUA)*, the *State Water Commission of Guanajuato (CEAG)*, and the *National Water Association of Mexico (ANEAS)*.

The WaCCLiM pilot utilities of San Francisco del Rincón are already pioneering the way towards sustainable, low-carbon, urban water management: **2.500 t CO<sub>2</sub>e/year** are avoided by expanding wastewater treatment services.

Further promising energy savings measures are being investigated for water supply and wastewater system to reduce both GHGs and operational costs.






Increased coverage  
40 % → 80%

Optimized wastewater  
treatment

**GHG mitigation**

 2,500 t/a

**Beneficiaries**

 100,000 people

## The Solution Peru

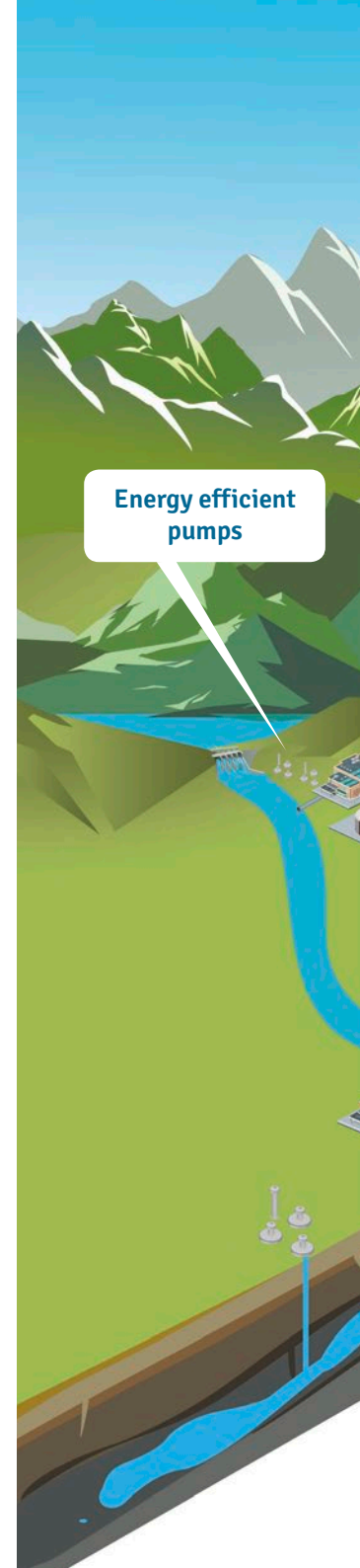
Peru is particularly vulnerable to the impacts of climate change. Droughts, intense rainfall or mudslides affect drinking water and wastewater services – impacting the availability and quality of water, or damaging the utilities' infrastructure.

Water and wastewater utilities in Peru are pioneering a new approach to address climate change through reducing their carbon footprint and their vulnerability to climate change.

Peruvian utilities have started to prepare their *Mitigation and Adaptation Plans for Climate Change* (PMACCs, acronym in Spanish). PMACCs<sup>1</sup> help utility staff account for their GHG emissions and to identify mitigation and adaptation measures to climate change, contributing to the economic and environmental sustainability of utilities as well as enhancing their services.

WaCClIM supports the *Ministry of Housing, Construction and Sanitation* (national level) and the *pilot utility of Cusco – SEDACUSCO* (local level) as well as other utilities across the country to scale-up the project approach. A successful example was implemented by SEDACUSCO: more than **5,300 tCO<sub>2</sub>e per year** were avoided through improved sludge management resulting in increased biogas production.

<sup>1</sup> developed in collaboration with the BMZ funded PROAGUA II programme






Optimized  
Sludge  
Management

**GHG mitigation**

 5.300 t/a

**Beneficiaries**

 415.000 people

## The Solution Thailand

Located in one of the regions most vulnerable to the impact of global warming, Thailand has established policies, action plans and climate change mitigation and adaptation strategies over the last several years.

A growing population, urbanization, industrial and agricultural expansion increase the demand for water and wastewater services. At the same time climate change impacts including severe flooding and extreme drought increase the challenges that water managers are facing.

Recognising the importance of climate change mitigation in the wastewater sector beyond the municipal level, the WaCCliM project is working with the *Ministry of Natural Resources and Environment (MNRE)* and the *Wastewater Management Authority (WMA)* to improve the carbon balance of the *pilot utility of Chiang Mai*.

Additionally, three following utilities in Hat Yai, Sansuk and Krabi municipalities, have started their journey towards climate mitigation in 2017.





Energy efficient pumps

Repair sewer system

**GHG mitigation**

 400 t/a

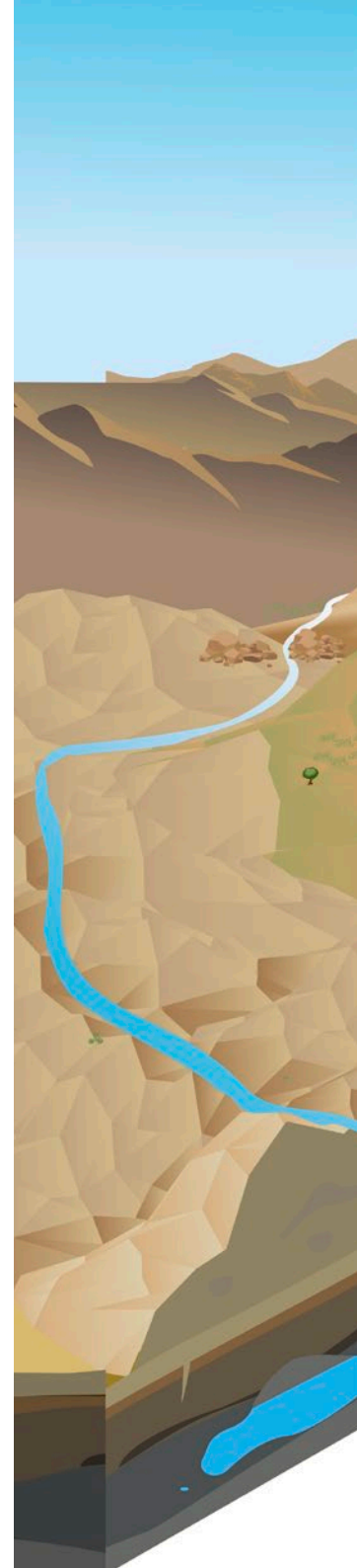
**Beneficiaries**

 100,000 people

## The Solution Jordan

Jordan is the world's second most water-scarce country. Energy consumption accounts for around 73% of Jordan's national emissions and 14% of these are attributed to the water sector. Water pumping is responsible for the majority of this consumption and is estimated to increase twofold by 2030. Jordan is therefore facing a long-term need to reduce its water and energy consumption.

WaCCliM is supporting the work of *Miyahuna-Madaba*, a pilot utility in Jordan that is implementing energy and GHG emissions reduction measures in cooperation with the *Jordan Water Authority (WJA)* and the *Ministry of Water and Irrigation*.



Energy efficient pumps

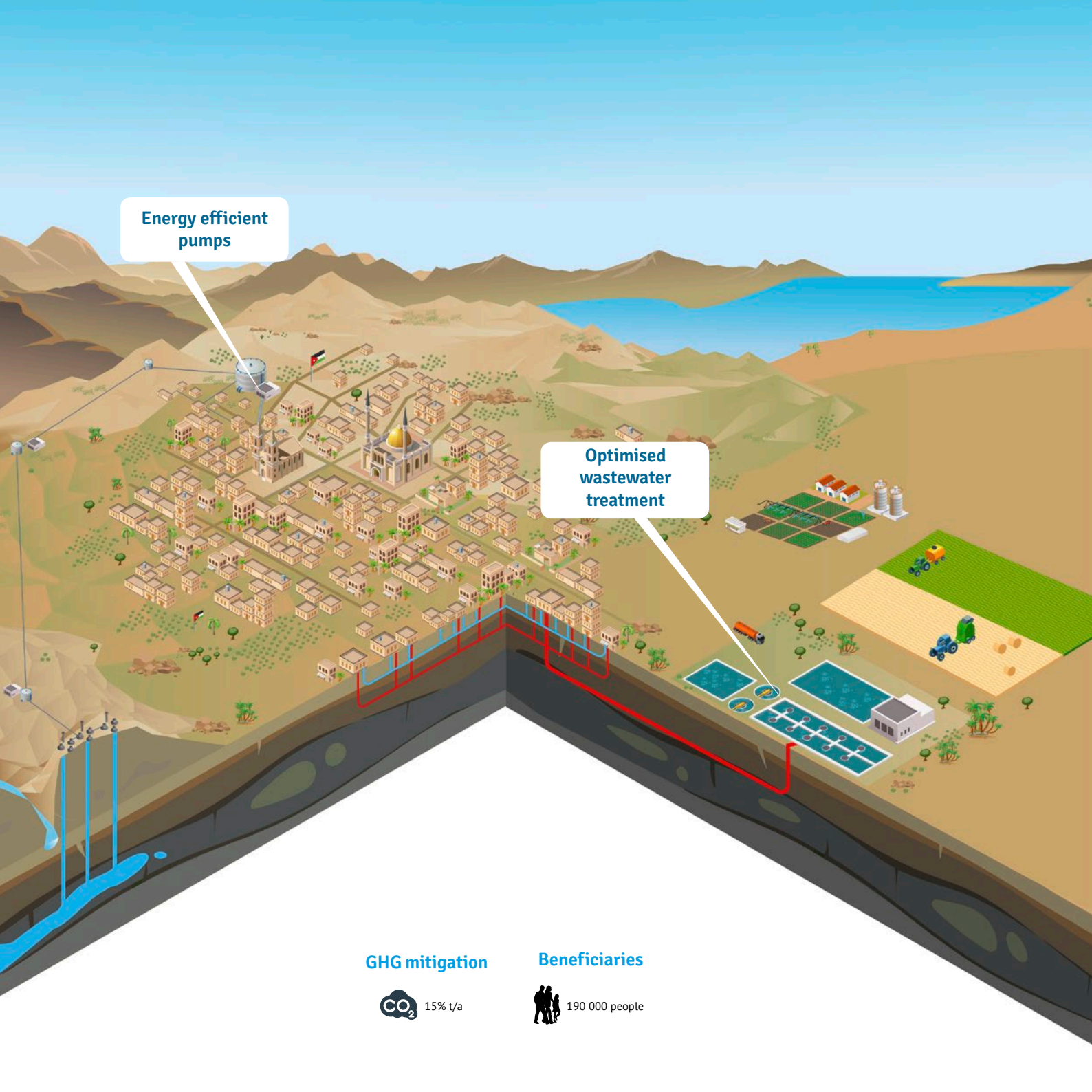
Optimised wastewater treatment

GHG mitigation

Beneficiaries

CO<sub>2</sub> 15% t/a

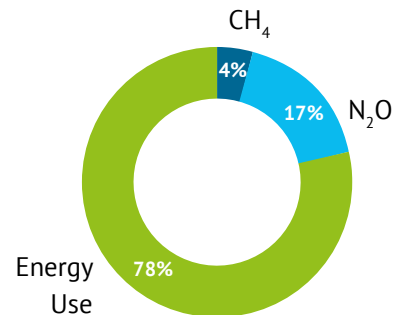
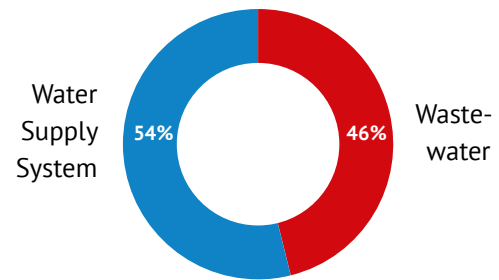
190 000 people



# Our Co-Benefits

Based on GHG emission reduction and cost effectiveness, measures that can lead to a **total of ~ 10,000 tCO<sub>2</sub>e/year** reduction per year were prioritized in the four cities. Benchmarking the Carbon footprint can become a powerful tool to enhance climate mitigation measures in the water sector.

The WaCCliM project has multiplying effects on the sustainability agenda, helping to make progress towards health and well-being (**SDG 3**), clean water and sanitation (**SDG 6**), affordable and clean energy (**SDG 7**), sustainable cities and communities (**SDG 11**), climate action (**SDG 13**), life below water (**SDG 14**), and life on land (**SDG 15**), among others.



Global warming potential distribution of the San Francisco del Rincón, Mexico, urban watercycle. CH<sub>4</sub> and N<sub>2</sub>O are emitted during waste-water treatment processes.





# Our Partners

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WaCCliM works with multiple national and international partners to address carbon and GHG emissions in drinking water and wastewater utilities.

**SEMARNAT**  
SECRETARÍA DE MEDIO AMBIENTE  
Y RECURSOS NATURALES



Ministry of  
Natural Resources  
& Environment



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