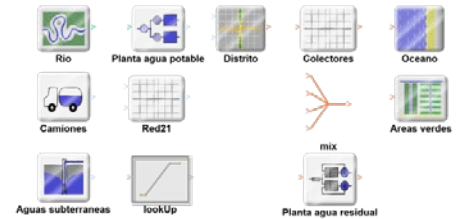


# Sustainable Water and Wastewater Management in Urban Growth Centres Coping with Climate Change - Concepts for Lima Metropolitana (Perú) -

## “LiWatool” simulator for modelling urban infrastructure systems and scenario simulation of Lima’s water and wastewater system

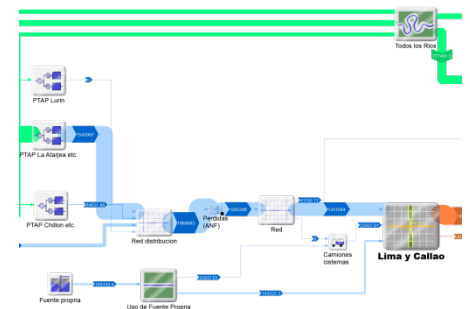
### Situation

- Complexity of the water and wastewater system of Lima and Callao
- Multitude of actors and institutions involved with the water and wastewater system
- Variety of potential action measures
- Uncertainty of knowledge about future developments, various scenarios
- Need for balanced discussions and decisions
- > System simulation as a means to deal with this complexity



### Methodology

- Development of a simulator for urban systems on macro level
- Calculation and visualisation of fluxes and resources
- Based on resource network simulation and Material Flux Analysis
- Development by ifak ensured meeting the needs
- Various solvers for systems of linear and non-linear equations
- Highly flexible, can be extended and modified by the user
- System model of Lima and Callao’s water supply and wastewater systems, applied in Round Table meetings for the evaluation of scenarios and measures
- Evaluation of demand versus supply, consumption, energy, discharges of organic material, revenue by tariffs



En la siguiente tabla se muestran los valores para el ÚLTIMO año 2040

Criterio	Valor	Unidad
Consumo deseado por riego	123.888	l/hab/día
Agua potable suministrado	19.797	m <sup>3</sup> /s
Consumo agua potable deseado total	22.929	m <sup>3</sup> /s
Demanda ciudad	35.853	m <sup>3</sup> /s
Demanda total (incl. riego)	38.33	m <sup>3</sup> /s
Oferta total (incl. ríos...)	38.291	m <sup>3</sup> /s
Oferta - Demanda total	-1.259	m <sup>3</sup> /s
Ingreso por tarifas	1790.577	millones PEN/a
Consumo de energía	189.905	millones kWh/a
Desagües	716.862	millones m <sup>3</sup> /a
Descarga DBO al mar	242.78	toneladas DBO/a

### Results

- “LiWatool” simulator, easy-to-use simulator for the conceptual modelling of urban infrastructure systems; multilingual features
- Application to water and wastewater systems of Lima and Callao
- Simulation and discussion of scenarios and of potential action measures with the relevant actors
- Training courses on macromodelling with LiWatool
- Transfer applications to other cities



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