TRUST
Innovative planning tools for water management in water-scarce regions

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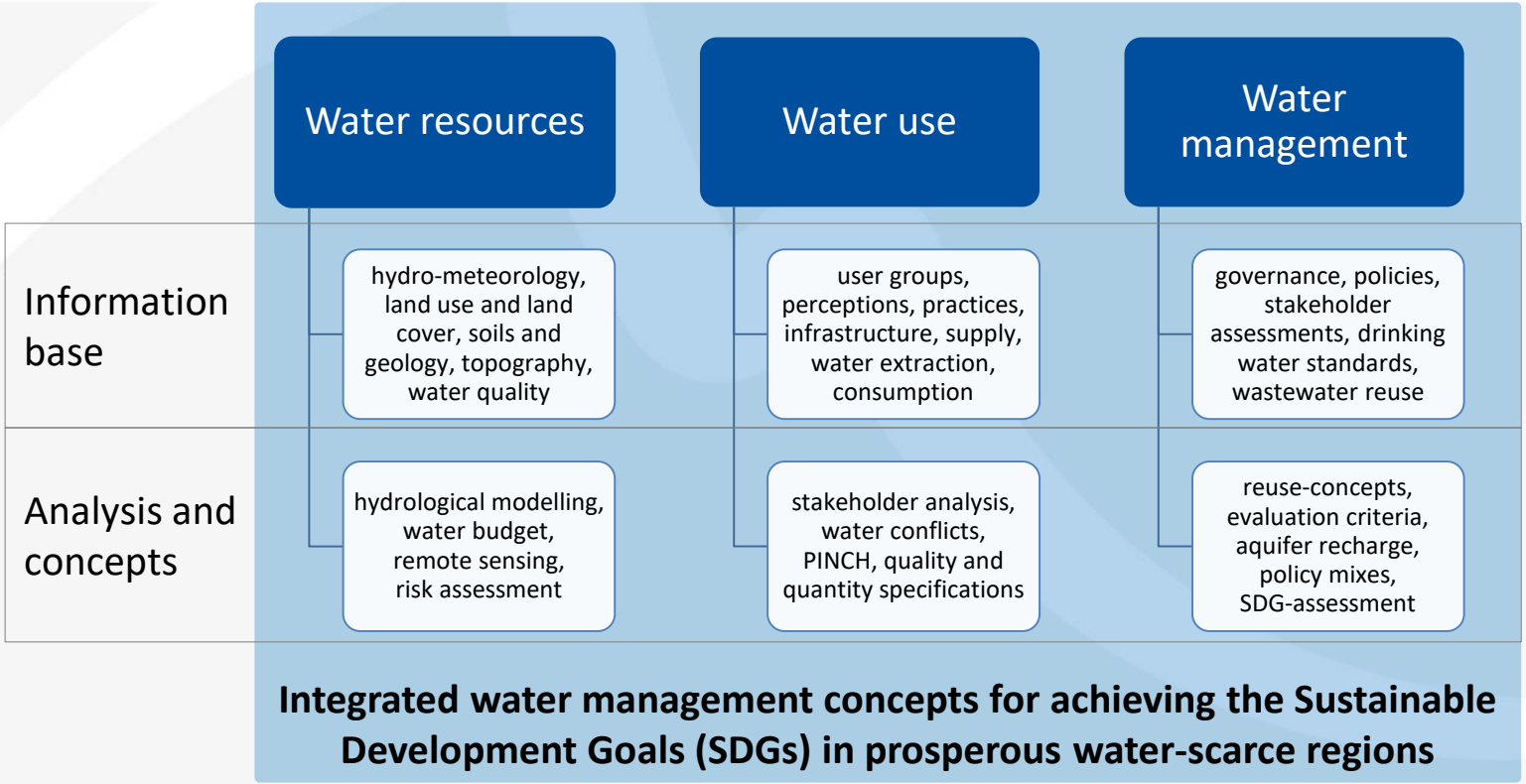
Universität Stuttgart · KIT Karlsruher Institut für Technologie · TZW Technologiezentrum Wasser · disy · decon international · Ingenieurbüro Pabsch & Partner · ipp · OTT · Federal Ministry of Education and Research · GRoW Water as a global resource

How to achieve SDG 6 in water-scare regions of the world?

Lima/Peru

- economic growth region
- high population growth
- increasing water demand
- water use conflicts
- unequal access to safe drinking water and sanitation services
- complex governance structure

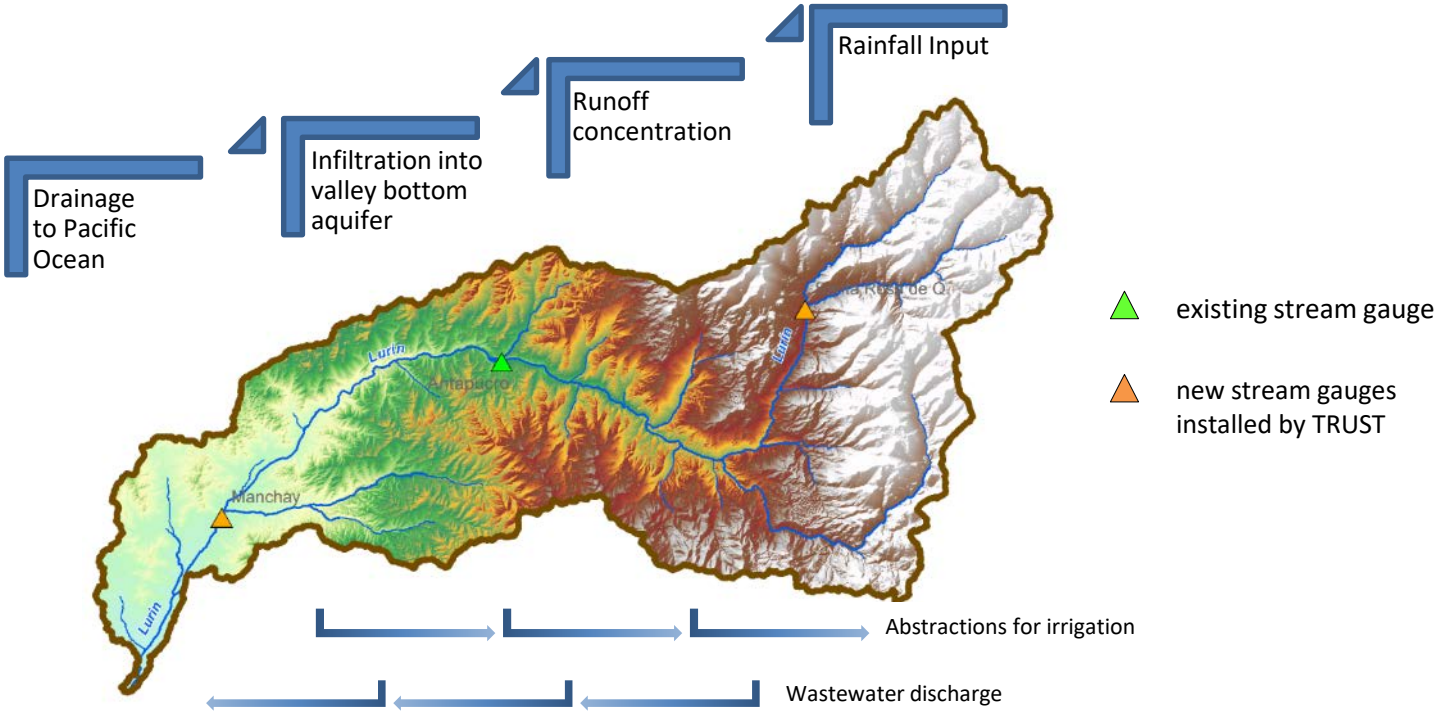
TRUST approach



Water resources

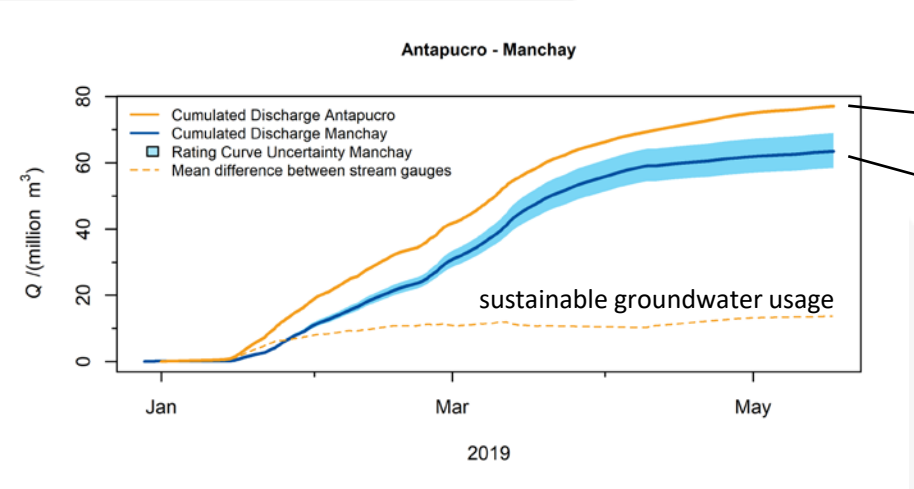
- **Lurin River**: strong seasonality, incomplete monitoring
- new **monitoring stations** for rainfall and discharge
- **hydrological modelling**
- **remote sensing**
- WSP-Tool: innovative tool for **risk assessment** at catchment level

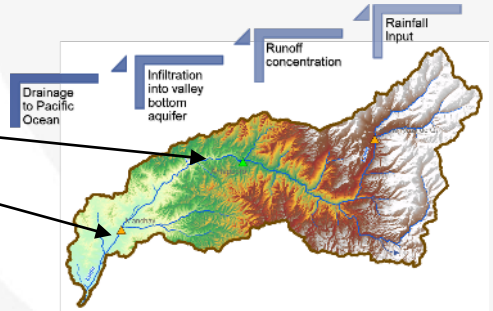
Hydrology of the Lurin River



Quantification of available Water Resources

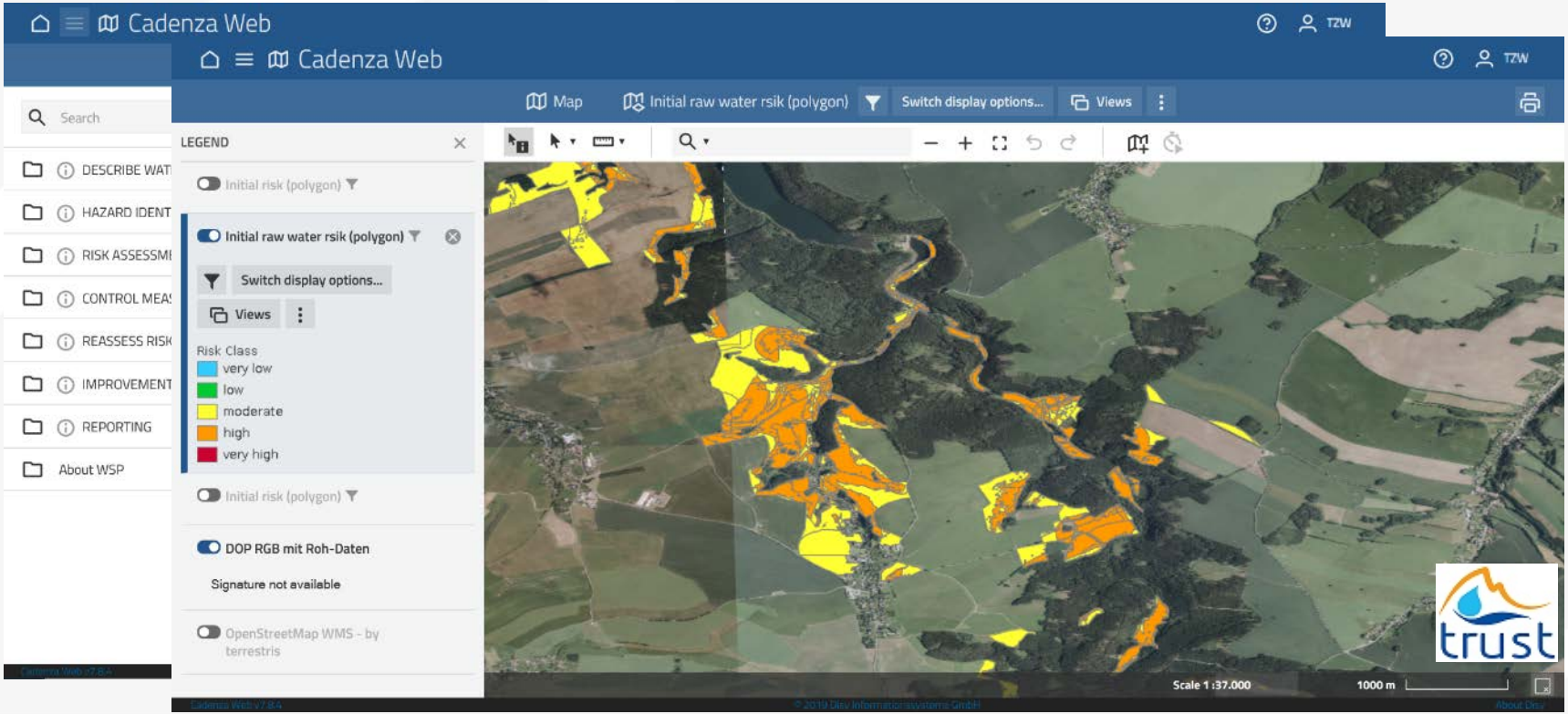
- two stream gauges (Antapucro and Manchay) allows to estimate
  - amount of infiltrated river / sustainable groundwater usage
  - water drainage to Pacific Ocean / unused water resources





→ Marketplace

WSP-Tool: interactive tool for risk assessment on catchment level



→ Video/webinar

Water use

- **water users**: stakeholder analysis, objectives and policies
- **policy mix design**: newly developed policy-interaction modelling approach to **analyze synergies and trade-offs between different objectives of different water users** on the level of interactions between instruments and measures
- tested within **participatory processes** involving stakeholders from entire catchment
- for **strategic planning** of sustainable water use

Policy-interaction matrix for the Lurin catchment

14 objectives

47 policies

Upper Lurin

- Households
- Wastewater
- Agriculture
- Ecosystems

Lower Lurin

- Households
- Wastewater
- Agriculture
- Ecosystems
- Industry
- Context
- SDGs

Assessing impacts on effectiveness of policies

Kosow et al. 2020 in prep.; visualization inspired by Weitz et al. 2019

→ Webinar

Analyzing inconsistencies within the status quo policy mix

„inconsistent policy“ = does not follow the networks impact logic (measured by CIB impact balances; more arguments for alternatives)

Key findings:

- groundwater abstraction by several users
  → water quantity conflicts
- insufficient wastewater treatment (domestic and industrial)
  → water quality conflicts

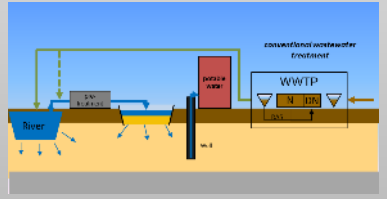
Water management

- integrated solutions for **drinking water supply and wastewater treatment**, adapted to local boundary conditions
- **capacity building** (operator) and **awareness-rising** (user)
- concepts for reuse of treated wastewater for **managed aquifer recharge**

Case study: concepts for the Lurin River catchment

Reuse potential lower area:

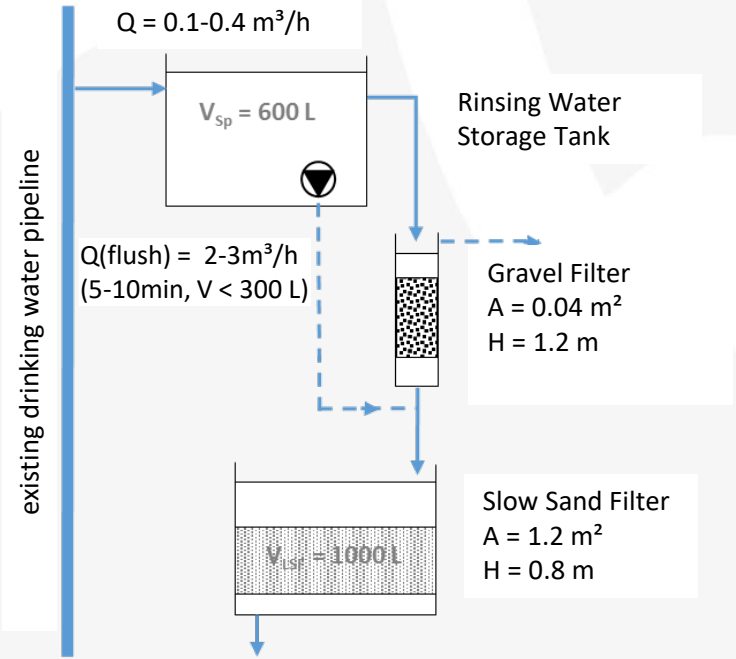
- Agriculture: irrigation
- Industry: process/cooling
- Infiltration to prevent seawater intrusion into the aquifer
- Aquifer recharge: indirect reuse as drinking water, irrigation, industry, ...



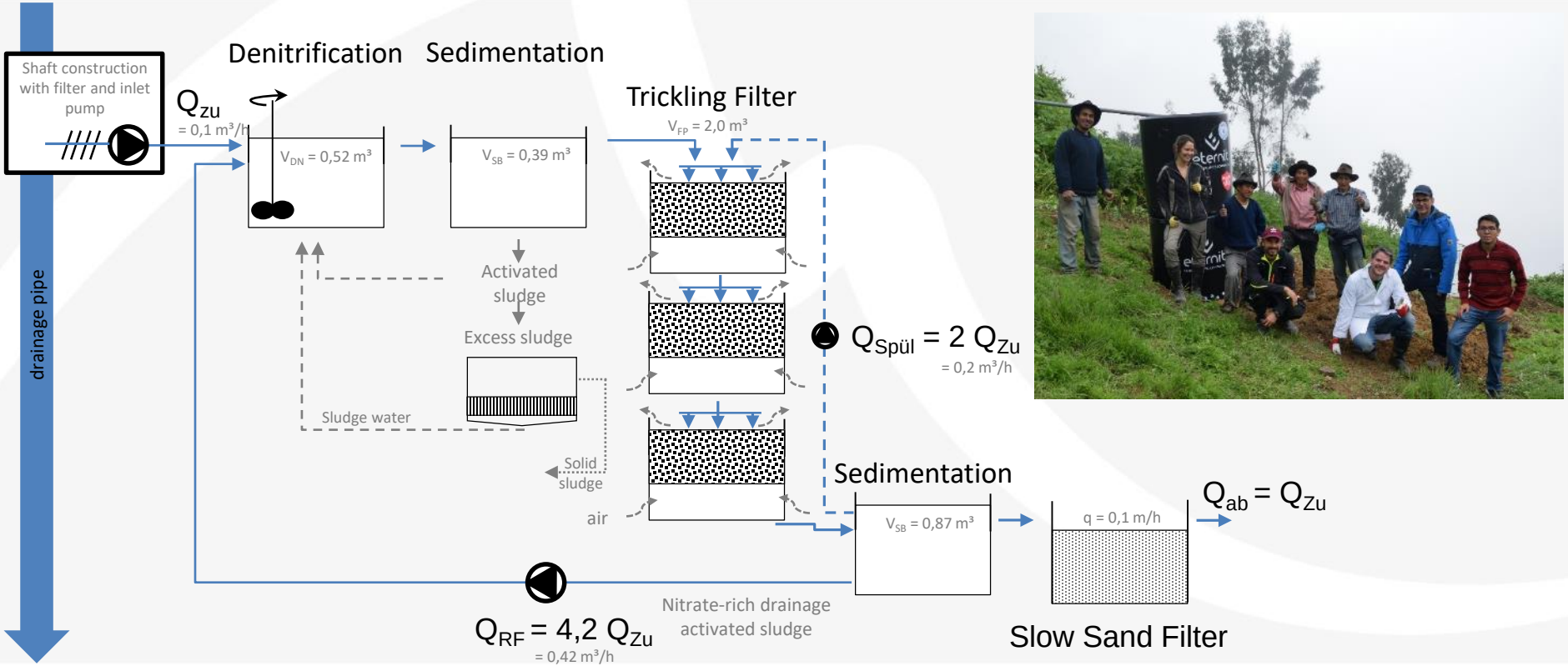
Upper area:

- Safe drinking water and wastewater treatment
- Participatory assessment
- Empowerment of communal organisation
- Pilot plant testing

Upper catchment: safe drinking water supply



Upper catchment: safe wastewater disposal



→ Video

Conclusions

1. **Field work** remains necessary for data on water quantity and water quality. Remote sensing data and derived products using machine learning (ML) to increase data availability still requires further research.
2. **Policy-interaction modelling** is a useful starting point for **integrated water planning processes**, contributing to reduce goal conflicts, to meet the demand of all water users and to attain SDG 6.
3. **Training and capacity building** of local water service providers as well as **awareness raising** of the local water users are key factors for successful implementation and **long-term operation** of drinking water and wastewater treatment plants.
4. **Implementation of participatory formats** during the planning process allows gaining a **socio-technical perspective** regarding innovative drinking and wastewater management concepts.

→ TRUST recommendations document (Marketplace)

Project partners

Universität Stuttgart	Center for Interdisciplinary Risk and Innovation Studies - ZIRIUS Institute for Sanitary Engineering, Water Quality and Solid Waste Management - ISWA
KIT Karlsruher Institut für Technologie	Institute for Water and River Basin Management - IWG Institute of Photogrammetry and Remote Sensing - IPF
TZW Technologiezentrum Wasser	TZW: DVGW-Technologiezentrum Wasser (Karlsruhe)
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