Sustainable water management in the emerging megacity of Lima – Based on macro-modelling and participation

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Peru:
- 5% of world’s fresh water resources
- Glaciers are disappearing
- Third most sensitive country w.r.t. Climate change
Urban growth centre Lima

- Lima: Urban growth centre: 8 million inhabitants
- Significant population growth (2.1% p.a.), mainly in peri-urban settlements
- Desert region, almost no rainfall (9 mm p.a.)
- Challenging boundary conditions for sustainable drinking water supply (demographic and geographic situation)
- Climate change intensifies water crisis in Lima by melting of glaciers and lack of rainfall in the Andean region

Overview of “LiWa” project

- Climate change
- Sustainability goals
- Local boundary conditions
- Modelling
- Participation
- Education

Project outcomes:

- Macro-modelling tools
- Scenario analyses
- Governance models
- Educational programmes
- Guidelines
- Decisions
- Scientific dissemination
- Industry liaison
The partners of the “LiWa” project

- Germany
  - ifak e. V. Magdeburg (Coordinator)
  - ZIRN, University of Stuttgart
  - IWS, University of Stuttgart
  - Leuphana University Lüneburg
  - Dr. Scholz & Dalchow

- Peru
  - SEDAPAL S.A.
  - Universidad Nacional de Ingenieria
  - Foro Ciudades para la Vida
  - FOVIDA

- Funding: BMBF and BMZ

Sustainable water management: Challenges (systems approach)

- The underlying system
  - Dynamic, fast growing, complex, many subsystems
  - Numerous interactions (of subsystems and processes)
  - Uncertain predictions of future system states

- Present solutions
  - Often driven by particulate interests (e.g. private companies)

- Proposed approach
  - Modelling to cope with complexity
  - Participatory discussion and decision approaches, ensuring ownership
Planning and analysis of water system on a global (metropolitan) scale

Modelling and visualisation of scenarios and variants

Modelling of:
- Water
- wastewater
- pollution
- Energy
- other resources
- GWP
- qualitative parameters

“LiWatool” – Macro-modelling system for urban systems (here: water/wastewater in Lima)

Modeling of:
- Urban water system as an entirety
- Water, pollution, Energy, GWP, also qualitative parameters
Some aspects of “LiWatoool”

- Simulation
  - Visualization by
    - Sankey diagrams
    - Report generator, Excel output
    - GoogleEarth interface

- Time series processing
  - Evaluation of
    - Scenarios (e.g., climate change, population growth)
    - Options to act
    - Comparison (e.g., w.r.t. costs)

- High flexibility in definition of models, equations and processes
  - Transferable also to other cities
THANKS FOR YOUR ATTENTION

Project „LiWa“
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