go-CAM – Sustainable Management of Water Resources in Coastal Regions

Water as a Global Resource (GRoW)

In coastal regions around the world, sustainable water use poses major challenges, with climate change, rising sea levels, the risk of salinization, the discharge of nutrients from agriculture, and low elevation placing significant pressure on water resources in these areas. Demographic growth and ever-increasing water demand from industry are adding to this stress. Water conflicts are becoming increasingly common as a result of the overexploitation of water resources. The aim of the joint project go-CAM is to use modelling to forecast the development of water resources in coastal regions, taking into account the various contributory factors. Based on these models, project researchers will develop different options for the comprehensive and sustainable management of coastal water systems.

Understanding Processes with Scientific Models

Climate change will have a particularly palpable impact on the economic and living conditions of people in coastal areas. Is the supply of freshwater to coastal regions guaranteed in the long term? How significant is the risk of salinization caused by rising sea levels? How well informed are the key stakeholders in the water sector about the consequences of increasing water stress in coastal regions? To explore these questions, go-CAM project partners are developing an integrated, transferable management system for coastal zones. This planning tool will be part of an online dialogue platform called "Coastal Aquifer Management (CAM)". The system offers possible courses of action to address challenges in water management specific to coastal areas. These can be applied in practice and are highly transferrable to coastal areas worldwide. As a basis for the research, case studies in northern Germany, Brazil, Turkey and South Africa are being analyzed in detail.

Innovative eco-hydrological models form the basis for assessing both, water availability and water demand in coastal regions. The project researchers use these models to produce water balance estimates that indicate the amount of water theoretically available for sustainable use in a specific region without deterioration of the regional resources. These models are also used to estimate regional groundwater recharge and distribution. They factor in the complex structures of coastal water catchments, e. g. the geological characteristics of the underground, as well as the specific climatic conditions and nutrient inputs. By applying given climate, socioeconomic and demographic scenarios, the project researchers use the models to calculate estimates for the future availability and quality of regional water resources.

Groundwater monitoring site with data logger. The data is used to model future water balances in coastal regions.

Developing Regional Strategies

Not only do the models outlined provide insights into the water systems and underlying processes in coastal areas; they can also be used to test the impact of different decisions in the water sector on coastal water resources. This involves decisions being analyzed according to a range of criteria; here, the primary objective is sustainable use of resources.

Modelling results and decision analyses outputs are fed into a coastal zone management system that facilitates the development of optional regional management strategies. This planning tool will be readily available on the online CAM dialogue platform and is to be transferred to coastal regions worldwide.

Transfer to Partner Regions Around the World

In cooperation with representatives of different interest groups in the regional case studies, the project partners calculate the estimated future water demand in the respective regions, i.e. Friesland (north-west Germany), the metropolitan region of Recife (in north-east Brazil), Antalya (Turkey) and the Eastern Cape (South Africa). Within the scope of this cooperation with partner regions, the developed regional strategies are to be translated into concrete action; this way the CAM dialogue platform will be introduced internationally. By way of accompanying workshops with various user groups, the project strengthens the acceptance of the new methods and the overall project findings. A PhD programme with associate partners from around the world is also intended to ensure that the methods and tools developed will continue to be applied beyond the project's conclusion.

Wiedel pumping station and sluice gate in northern Germany: sustainable strategies in the context of coastal zone management need to consider different interests and water demands.