

Title: **Sustainable land and water management of reservoir catchments by applying innovative remote sensing research methodologies**

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In mountainous areas of Germany, e.g. in *Thuringia* and in Poland, e.g. *Malopolska* the supply of potable water to the population significantly depends on water reservoirs located in the nearby low mountain ranges. They receive good water quality inflow from their catchments and are surrounded by protection zones permitting only limited agricultural land use. Outside these zones agriculture and economic development is not restricted. Gradual changes in land use and climate are impacting water quantity and quality of the rivers and creeks inflowing into the reservoirs and put their water quality at risk.

These impacts are successive in nature and difficult to identify in their spatial distribution but gradually increase the nutrient input to the reservoirs from nonpoint and point sources, erosion, degraded and abandoned industrial areas. In result they cause consequent eutrophication within the reservoir which in turn is promoting algae blooms and is increasing the cost of water purification putting the function of the reservoir at risk in the long term perspective. A number of technologies and approaches have been elaborated to protect environment and aquatic ecosystems from that pressure but reservoir authorities still lack appropriate methodologies to elaborate on these issues and to develop preventive and adaptive strategies.

The overall objective of this research is to develop a conceptual approach and methodology to assess, analyse and evaluate the water and solute transport dynamics within reservoir catchments. With the help of this insight decision support to respective planning and management authorities will be provided to mitigate impacts of changes in climate, land use and socio-economic development.

Airborne and spaceborne optical remote sensing data and object based classification techniques are applied a) to provide up-to-date LULC and b) to identify and locate unknown point sources of waste water releases to the water bodies.