

816.330 Water Resources Planning and Decision Making

816.338 Water Resources Planning and Management

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Aim of course

The objective of this course is to provide an overview about assessment and decision making techniques in water resources development. Due to the fact that water projects exhibit an extremely long lifetime and have also a broad scope of impacts it is obligatory to assess properly the whole set of impacts of water projects. The course tries to develop a methodological framework assisting in the integration of conflicting objectives like economic, social and environmental goals.

Subject of course

This course provides a general overview of water resources development strategies. In the first part a formal systems framework based on a state space formulation of water resources planning is developed. Then optimisation techniques including linear, nonlinear and dynamic programming are explained. Then, various evaluation techniques are explained and demonstrated by the help of case studies. The emphasis is here on classical economic evaluation techniques like cost-benefit analysis, cost-effectiveness approaches.

Growing sensitivity to ecological topics requires an extension of project assessment, including environmental aspects and therefore a framework is proposed which follows the US Principles and Standards for Water Resources and which is based on four objectives considering economic, regional, social and environmental objectives. Multi-attribute utility theory, methods with prior formulation of preferences, with iteratively defined preferences and without any preference structure are explained. Aspects of sustainable development and the implications for water resources are discussed. To specify sustainability three criteria referring to risk reduction, reversibility and equity principles are proposed.