Water is one of the overarching cores of sustainable development for the survival of local communities. However, the challenges of obtaining safe water in a sustainable way make it still an unfinished task especially in developing countries where turbid surface water is collected. The rationale of this doctoral thesis is based on the idea that in order to ensure safe drinking water in a sustainable way, indigenous local ecological knowledge of water treatment from nature-based materials needs to be integrated with a scientific approach through efficient reduction of surface water turbidity and avoiding microbial contamination.

Indigenous water treatment knowledge systems were studied in Ethiopia through an ethnobotanical based approach and were followed by experimental studies for optimization. From the surveys, four candidate plants were identified: *Maerua subcordata*, *Moringa stenopetala*, *Sansevieria ehrenbergii*, and *Sansevieria forskaliana*. The grinded powder from plant parts was utilized to imitate the traditional method used by local communities. Crude extraction or purified active components were used in different conditions (pH, temperature and turbidity levels) to obtain the best coagulation method from plantspecies to be used as water treatment agents. The extracts from tubers of *Maerua subcordata* or seeds of *Moringa stenopetala* resulted in lowest turbidity levels but were not effective disinfectants. Therefore, we tested a simultaneous treatment of coagulation for turbidity removal efficiency and of solar disinfection (SODIS) to produce potable water free of disease-causing microorganisms.

This approach that unites indigenous knowledge, nature based materials and standardized experiments, can be scaled-up to household level to produce adequate and safe drinking water.