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ADVANCING A JUST,LOCALLY LED CLIMATE ACTION

Globally, groundwater is the major drinking water resource. Improving the sustainability of groundwater abstraction for drinking water calls for adaptation on a local scale. The aim of this research is to develop a locally oriented, integrated sustainability assessment framework to support the adaptation planning process for local drinking water abstractions. The framework uses 45 socio-economic, physical and technical sustainability criteria. Future developments that affect the sustainability of local drinking water abstractions are the increasing water demand, land use change, climate change and soil energy transition. Based on the sustainability challenges of local drinking water abstractions, water saving, protection and restoration of raw water quality, mitigation or reduction of impact of abstraction and improvement of supply security are identified as adaptation strategies. To illustrate the proposed approach the sustainability assessment framework was applied to two local drinking water abstractions in the Netherlands. The paper concludes that the proposed framework provides decision- makers with a transparent understanding of trade-offs that decisions have, and the information generated by the framework supports a careful balancing of relevant aspects playing a role in a decision on adapting local drinking water abstractions. Further development and up scaling of the proposed framework to a drinking water company's level will contribute to sustainable development of drinking water abstraction on a strategic level. Worldwide awareness of the urgency of sustainable development has increased ever since the Brundtland report defined this as the way 'to ensure that development meets the needs of the present without compromising the ability of future generations to meet their own needs' (United Nations 1967). In 2015 the "2030 Agenda for

Sustainable Development" was presented, including Sustainable Development Goal (SDG) 6: to "ensure availability and sustainable management of water and sanitation for all". Although improvement is visible, the World Health Organization and Unicef (2017) estimated that in 2015 still nearly 30% of the global population lacked safely managed drinking water services. SDG 6 enhances not only access to safe and affordable drinking water for all, but also improvement of water quality, sustainable withdrawal of fresh water and implementation of integrated water resources management (United Nations 2015). Globally, groundwater is the major drinking water resource (Ekins et al. 2019). Although groundwater is increasingly important for drinking water supply, use of groundwater can be constrained by the complexity and costs of abstraction, or because the resource is polluted or non-renewable, and poor groundwater management may result in pollution or unsustainable abstraction (Ekins et al. 2019) In Africa we need a good will from our National Government, County government and leaders from the grassroots.

A drinking water supply system is a heterogeneous technical network of pipelines connecting local drinking water abstraction facilities to the (local) customers. Water infrastructures are known for their complexity, with cross-scale feedbacks between society, technology and environment as well as between the local, regional and global scale (Démodé et al. 2016). This research focuses on the sustainability of local drinking water abstraction, which is shaped by technical infrastructure, geographical location and the used water resource. Because abstraction facilities are strongly embedded in the local environment and society, there are many stakeholders involved, often with competing interests and affecting the water system in different ways. To enhance the sustainable withdrawal of water, adequate adaptation policies and actions need to be taken.

The first long-term adaptation strategy that must be considered to adapt to an increasing drinking water demand is water saving, which will limit the demand growth (Kumar et al. 2016). However, the majority of the current drinking water abstractions will still be needed to meet the future drinking water demand. To identify adaptation options for local abstractions an integrated approach on a local scale is necessary, because of the strong embeddedness of drinking water abstractions in the environment, and the strong spatial and temporal variability in water systems. . Therefore, sound data and knowledge of the local situation are required to be able to understand the sustainability challenges such as pollution of the water resources (2015. Each abstraction may face different sustainability challenges caused by local socio-economic, physical or technical characteristics, and thus require specific adaptation strategies. An integrated assessment framework focusing specifically on these local characteristics can support adaptation planning for drinking water abstraction.