Tropentag, September 17-19, 2018, Ghent

"Global food security and food safety:
The role of universities"

A Multi-criteria Approach for Assessing the Sustainability of Small-scale Cooking and Sanitation Technologies

Ariane Krause[1], Johann Köppel[2]

[1] *Technische Universität Berlin, Postgraduate Program Microenergy Systems at Center for Technology and Society, Germany*
[2] *Technische Universität Berlin, Germany*

Abstract

To reduce the consumption of firewood for cooking and to realise recycling-driven soil fertility management, three projects in Northwest Tanzania aim to provide the local smallholder community with 'new' cooking and sanitation alternatives. The present study proposes an integrated approach to assess the sustainability of the small-scale cooking and sanitation technologies. Based on the Multi-Criteria (Decision) Analysis (MC(D)A) method, we developed a decision-specific, locally adapted, and participatory assessment tool: the Multi-Criteria Technology Assessment (MCTA). Pre-testing of the tailored tool was done with representatives of Tanzanian and German partners of case study projects. From a methodological perspective, we conclude that the MCTA uses a set of relevant criteria and applicable methods to realise a transparent and replicable computational model and Excel-tool. The combination of MC(D)A for structuring the assessment with analytical methods, such as the Material Flow Analysis, for describing the performance of alternatives is a promising path for designing integrated approaches to sustainability assessments of technologies. Pre-testing of the tool can serve as a proof-of-concept for the principle design of the method. For future applications of the MCTA recommended adjustments include the inclusion of end-users of the technologies, the reduction of criteria through participatory selection from the provided catalogue of criteria, and an increase of feedback loops and group discussions between participants and the facilitator to support a common and thorough understanding and joint learning. Main insights from pre-testing are that participating stakeholders perceive all technologies analysed (both cooking and sanitation), on average, as 'acceptable' rather than 'favourable'. Before considering the alternatives analysed as sustainable, however, further improvements are needed such as enhancing technological-operational and socio-economic performance of technologies or pushing political/legal actions that support the implementation of cooking and sanitation services on a household level.

Keywords: Biomass stoves, decision support, development of appropriate technologies, ecological sanitation, energy-sanitation-agriculture nexus, multi-objective evaluation, sustainability assessment, technology assessment

Contact Address: Ariane Krause, Technische Universität Berlin, Postgraduate Program Microenergy Systems at Center for Technology and Society, Sec. Hbs 1; Hardenbergstr. 16-18, 10623 Berlin, Germany, e-mail: krause@ztg.tu-berlin.de