The research period aims to complete a previous study performed in the frame of a Master Thesis, titled "Bio digestion as an effective option for wastewater recovery and valorisation in resource-limited contexts: case study in Dar es Salaam".

The study will be oriented to explore the potential of anaerobic biodigestion as an effective strategy for wastewater (WW) recovery and resource valorisation in resource-limited settings, with particular attention to urban and peri-urban areas of Sub-Saharan Africa. In many developing regions, limited sewerage infrastructure leads to extensive use of on-site sanitation systems, such as pit latrines (PLs) and septic tanks (STs). These systems generate significant volumes of faecal sludge that are often managed inappropriately, causing environmental pollution, public health risks, and the loss of valuable resources. Anaerobic digestion (AD) is a promising alternative that stabilise organic matter while producing biogas and digestate.

This study will explore the technical, environmental and operational conditions under which biodigestion treat and recover resources within decentralised sanitation systems, analysing the sanitation chain, focusing on user interfaces, containment technologies, and downstream configurations that influence the feasibility of AD. A case study conducted in Dar es Salaam, Tanzania, examines the characteristics of existing sanitation practices and faecal sludge management, as well as the potential integration of biodigestione technologies into local WW management systems.

This case study is developed within the framework of the Approach Project, a research initiative carried out by the Department of Civil, Environmental and Mechanical Engineering (DICAM), aimed at exploring sustainable solutions for WW and faecal sludge management (FSM) in rapidly growing urban contexts. The results highlight the importance of system configuration, sludge characteristics, and institutional conditions in determining the effectiveness of biodigestion. Combining decentralised treatment approaches with anaerobic technologies can contribute to the sustainable management of WW, the recovery of energy, and the circular use of resources in rapidly urbanising regions.

The researcher will spend a period abroad of about 1 month.