**Proposal for a master thesis**

**Master Programme Infrastructure and Environmental Engineering 2025/26**

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| **Title** |
| Proposal 1: Designing a Sustainable Agriculture and Irrigation System to Achieve Food Self-Sufficiency at Tumaini Open School |
| Description background and problem description, app. 150-500 words |
| **Background:**Tumaini Open School in Tabora, Tanzania, currently provides meals for 65 people daily and expects this number to double in the coming year, (with an end goal of serving 450 people daily). With the increase in annual food costs, establishing a sustainable farming system could drastically reduce expenses and even create a surplus for market sales. However, an inadequate access to water and ineffective agricultural practices pose major challenges.**Research Aim:**To develop a comprehensive plan for a sustainable agricultural system, including crop selection, irrigation design, and a business model that supports the school’s food self-sufficiency and financial independence.**Objectives:*** Identify high-yield, climate-resilient crops suitable for Tabora’s soil and rainfall conditions, focusing on maize, beans, rice, and vegetables.
* Evaluate modern agricultural techniques such as crop rotation, organic composting and agroforestry.
* Design a water-efficient irrigation system using greywater and rainwater harvesting with drip irrigation to minimize waste. Approximate water demands.
* Integrate organic waste (e.g. food scraps, manure) into a circular farming system through composting.
* Assess land productivity and project yield potentials on the current 3 acres and future expansions. Can a surplus of crops be harvested?
* Develop a business plan that includes input/output estimates, potential savings, revenue from marketable surplus, and payback period for infrastructure investments.

**Methodology:**Field assessments, interviews with school staff, local farmers, and other partners, cost-benefit analysis, yield modeling, and irrigation mapping. GIS tools may be used to plan optimal land use and irrigation layouts. Crop data will be aligned with FAO recommendations for smallholder farms in East Africa.**Expected Outcomes:**A replicable, low-input farming system and irrigation plan tailored to Tumaini’s environment and needs. The business model will show how sustainable agriculture could fully or partially finance the school’s food demand and operational costs within 3–5 years. The proposal will also guide donor engagement for funding implementation. |
| **Literature suggestions** |
| Suggestion:  |
| **Special prerequisites** e.g. courses |
| The master thesis will require that you visit Tanzania for three months in order to conduct field work. Funding for your field studies can be applied for via the link below:1. [Nils Rud Olson minnesfond (chalmers.se)](https://www.chalmers.se/utbildning/studera-hos-oss/studentliv/stipendier-for-studenter/nils-rud-olson-minnesfond/)
2. [The Global Mentorship Program (chalmers.se)](https://www.chalmers.se/en/education/study-at-chalmers/student-life/scholarships-for-enrolled-students/the-global-mentorship-program/)
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| **Specific timeframe** (start date-end date, if needed) |
| Starting from the beginning of 2026 until the end of the academic year. |
| **Supervisors** (name, email) |
| From Engineers without borders: Ding He and/or Eduardo Ruiz  |
| **Examiner** (name, email) |
| Unknown |
| **Other information** |
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