VicInAqua

Integrated aquaculture based on sustainable water recirculating system for the Victoria Lake Basin

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VicInAqua has received funding from the **European Union's Horizon 2020 research and innovation programme** under grant agreement No **689427**".

VicInAqua rationale

- High population density & rapid urbanisation
- High rate of poverty & poor sanitation system
- Growth of fish processing industry
- High wastewater discharge into the Lake Victoria -> overfertilisation
- Overfishing -> depletion of fish stocks
- Lack of awareness on environmental impact of fisheries & wastewater discharge

Aquatic weed outbreaks.

Kisumu city L.Victoria

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VicInAqua vision

- **VicInAqua** will develop innovative **multipurpose self-cleaning water filtration solutions** adapted for **sanitation** of different wastewater streams, **which will be reused in Recirculation Aquaculture Systems (RAS) & Agriculture Irrigation.**
- The technological development & demonstration at pilot scale will be combined with participative measures aimed at **capacity building of local and regional actors**.
- A special focus is set on the robustness, energy efficiency & economic viability of the **VicInAqua** solutions in order to be adapted to the local challenges and to achieve a high acceptance in **peri-urban areas**, where the sanitation infrastructures are poor & the demand for water high.
- **VicInAqua** novel solutions are conceived as a tailor-made response to local sanitation & water supply needs of Victoria Lake inhabitants and industry.

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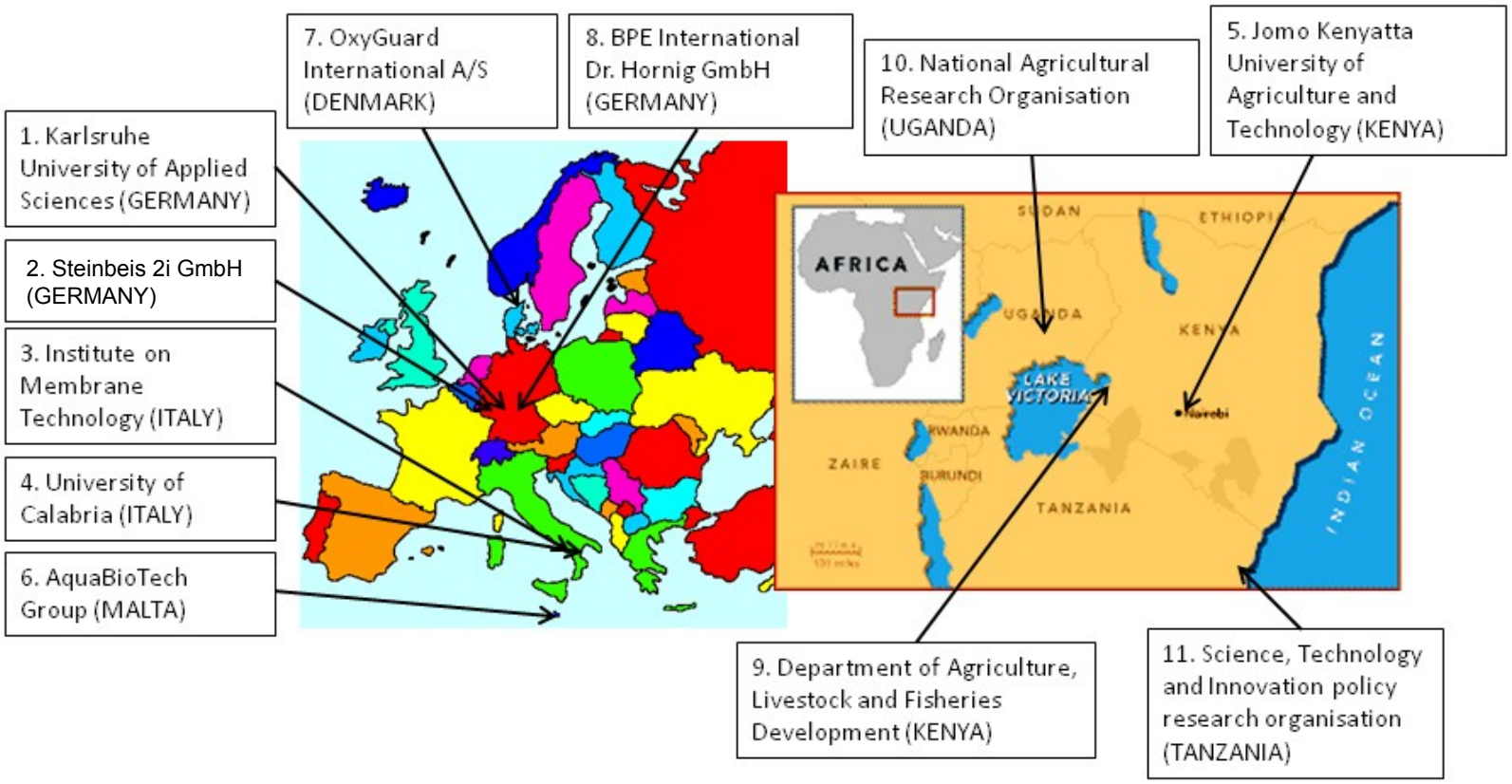
VicInAqua consortium



11 partners from 7 different countries (7 European and 4 African)

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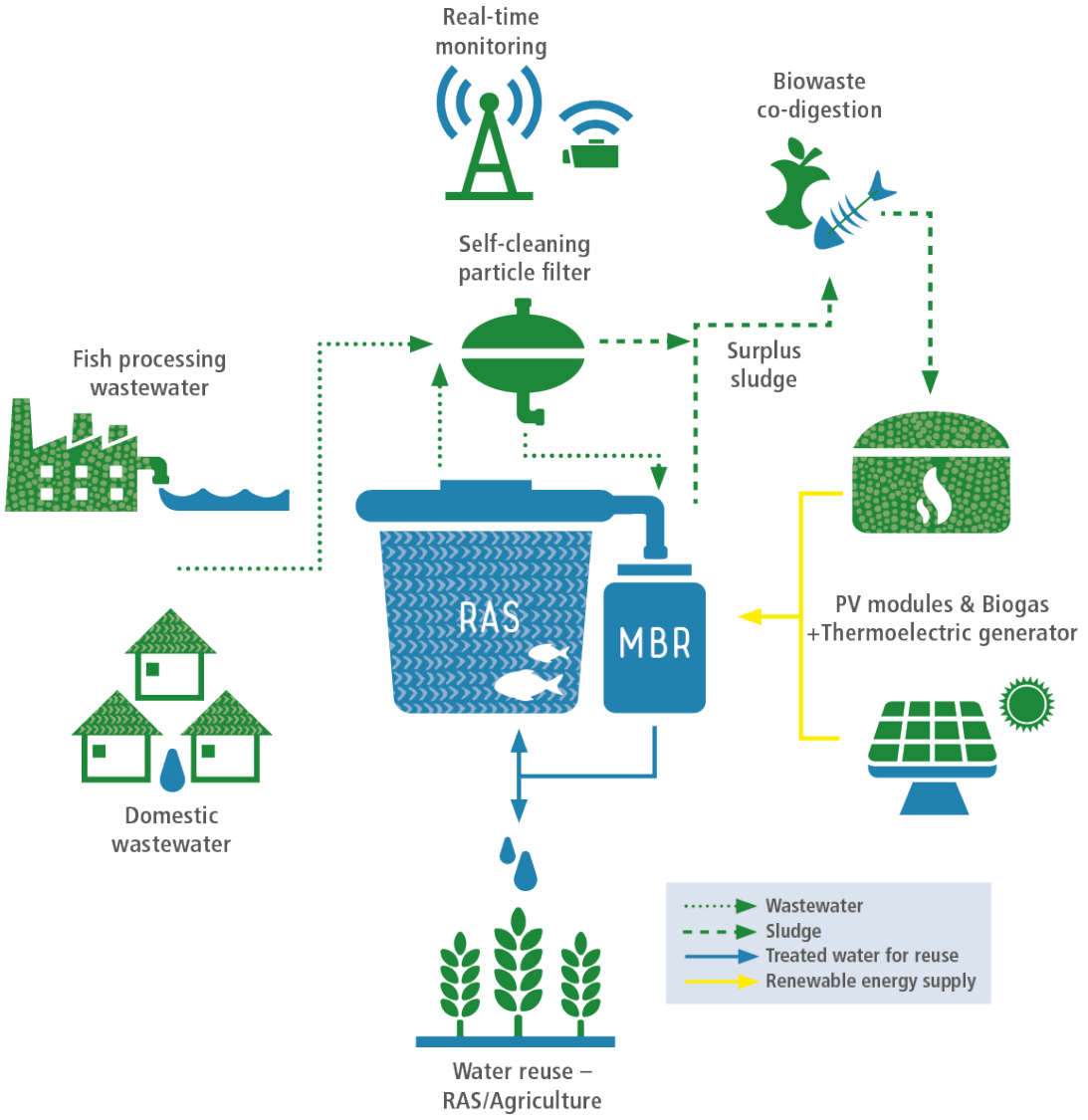
VicInAqua Technical Concept

- ✓ Develop a novel multipurpose filter system (Membrane bioreactor-MBR).
- ✓ Develop a novel high efficient energy supply system (Biogas, PV solar).
- ✓ Design a Recirculation Aquaculture System (RAS)
- ✓ Develop a robust, low cost control system in real time
- ✓ Re-use water in RAS and for irrigation.



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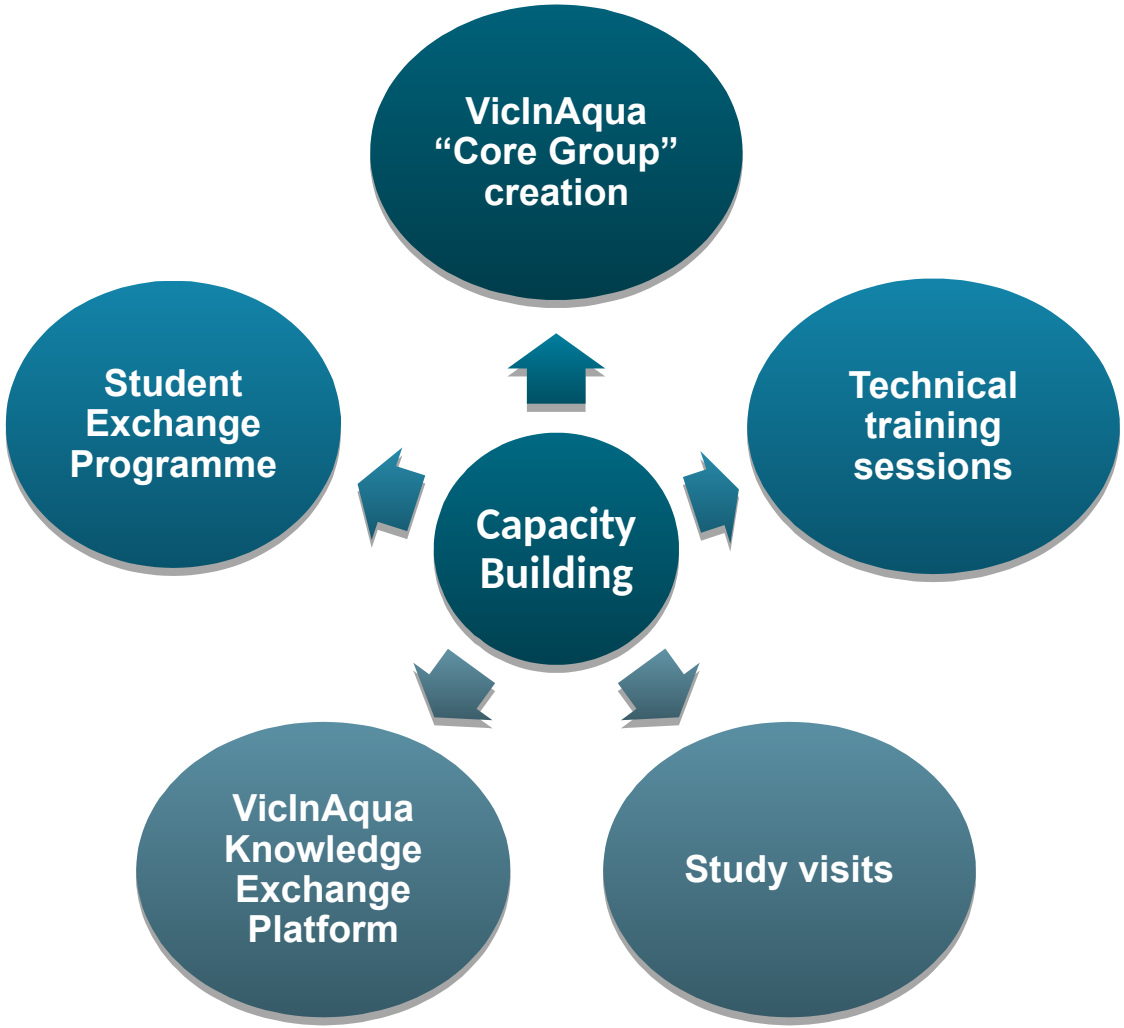
VicInAqua Capacity building



Providing a collaboration framework to enhance local capacities

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VicInAqua main objectives

- Development and screening of **novel self-cleaning membranes.**
- Set-up of a small technical **membrane bioreactor** (MBR) to supply clean water to RAS & agriculture.
- **Integrated renewable energy power supply** based on photovoltaics & biogas.
- A robust and low-cost **real-time sensor system for water management** based on wireless network monitoring.
- All R&D steps will be accompanied by an **Environmental Impact Assessment and socio-economic studies.**
- **Awareness raising, capacity building & knowledge transfer** among local population.
- **Foster gender equality & better integration of women** in aquaculture activities.

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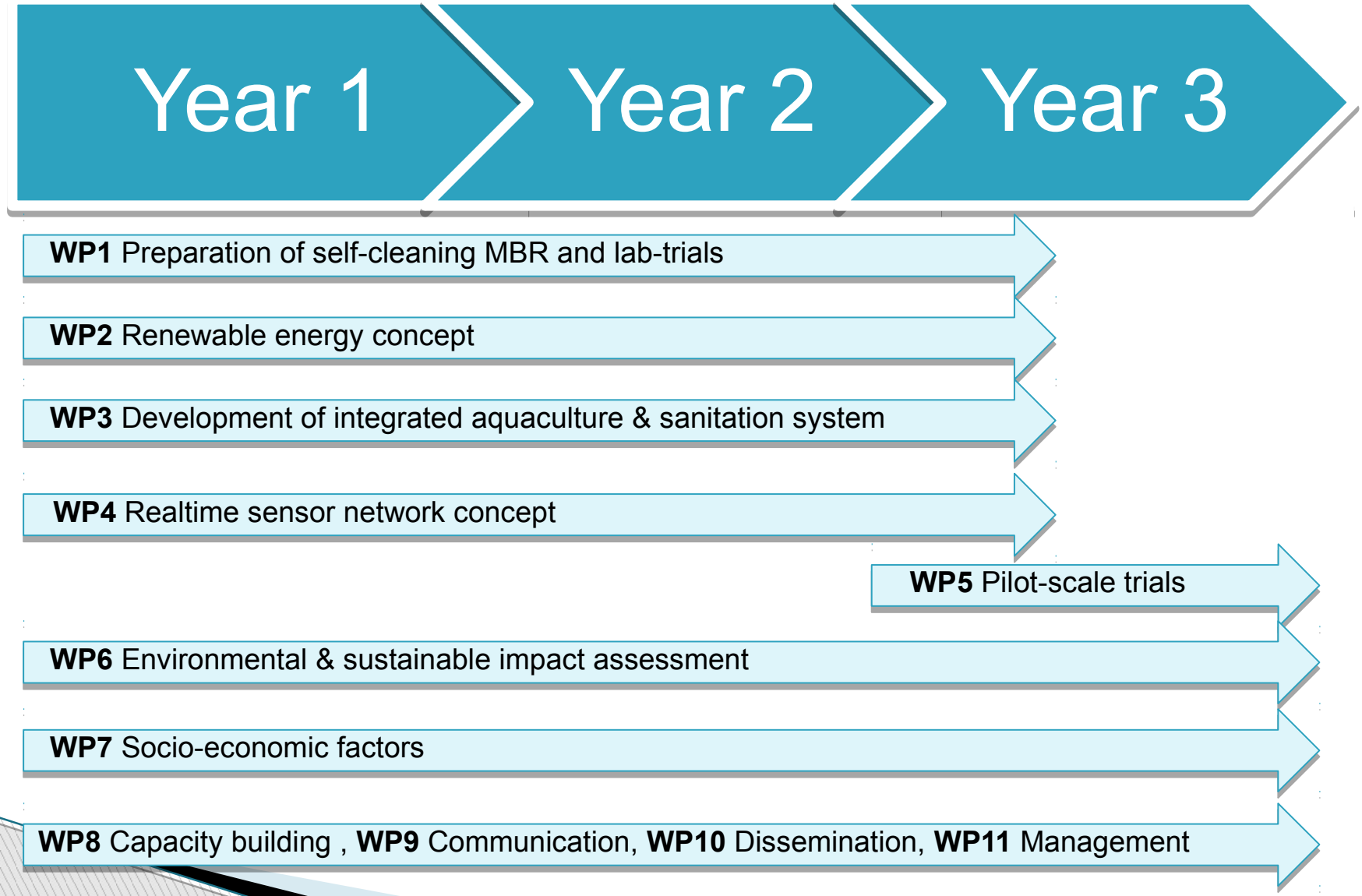
VicInAqua Methodology - 1



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VicInAqua Methodology - 2

The project will be broken down into 2 main phases:

Phase 1 - Research and development phase with 4 **workpackages**.

WP1 will address development and characterisation of novel nanostructured self-cleaning membranes for MBR on laboratory scale and **ITM-CNR** & **UniCal** will take care of it.

BPE and **HsKA** will focus on **WP2** for dealing with design and development of an adequate energy concept for integrated RAS based on photovoltaics and biogas combined with TEGs.

WP3 addresses design and set-up of a pilot RAS and it will be carried out by **AquaBioTech** and **HsKA**.

Oxyguard will be responsible for **WP4** and it will focus on a robust real-time multi-sensor system to measure water quality with a smart control system for the harsh environment in the Lake Victoria region.

Phase 2 – Piloting phase in WP5, which will be lead by **HsKA** and it will address pilot-scale trials of the VicInAqua concept in real environment of the Victoria lake area.

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VicInAqua Methodology - 3

The 2 phases are supported by the other work packages on the following aspects:

Socio-economic issues:

WP6 will address Environmental Impact Assessment of the entire VicInAqua concept and it will be lead by **JKUAT** and supported by partners **STIPRO, DAFLD** and **NARO.**

NARO will be responsible for **WP7** which will focus on the socio-economic issues of fish farming in the Lake Victoria region. NARO will be supported **STIPRO, DAFLD** and **JKUAT.**

Capacity building, Communication and exploitation: WP8, WP9 and **WP10** are concerned with capacity building, communication and dissemination & exploitation respectively and **S2i** will be responsible of these work packages.

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VicInAqua Impacts - 1

- **Effective sanitation** – Wastewater treatment (aquaculture, households, fish processing industry), solid waste management and utilisation.
- **Fresh water availability** – By avoiding release of fertilisers, antibiotics and diseases of aquaculture in the ecosystem; by reusing treated water for aquaculture and agriculture purposes.
- **Use of renewable energy** – Thereby reaching a very low CO_2 footprint and enabling autonomy to cover energy demand of **VicInAqua** facilities.
- **Assessment of the environmental impact, sustainability and life cycle analysis** - To guarantee a proper observance of environmental regulations.
- **Extraction and use of natural by-products (nutrients to be used as fertilisers)** - To be used in agriculture, thus providing a sustainable and environmentally friendly solution, which permits to take distance from chemical-based fertilisers.
- **Increase in fish production productivity** (Nile perch and tilapia) - and enabling the production of native fish species which can be step-by-step reintroduced in the Lake Victoria ecosystem.

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VicInAqua Impacts - 2

VicInAqua will empower local stakeholders in the agro and aquaculture sectors by:

- Raising awareness on the critical relevance of environmental protection and food security.
- Providing an integral technical solution for more effective sanitation and water supply.
- Translating the knowledge gained into economical benefit and job creation.
- Encouraging women to undertake a more active role in the aquaculture sector.

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Interested in VicInAqua activities?
Join our stakeholders community!

www.vicinaqua.eu

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- How best should we transfer the technology?
- How should the technology fit best in the Tanzanian context?

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Thank you for your attention !

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