Solar Electricity for Safe Drinking Water: Solutions and business cases in rural developing regions

Water for the most marginalized

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Off-Grid Power Workshop – Meet the Practitioners at the Intersolar Europe 2023

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AUTARCON and Sustainable Concepts GmbH

- Founded 2010 as for-profit spin-off
- AUTARKIC – solar driven drinking water treatment (10 – 1.000 m³/d) for remote hospitals, schools, villages, suburban areas
- Active in 12 countries worldwide with 70 installations in operation
  - Egypt, India, Tanzania, Nigeria, Nepal, Togo, Kamerun
- 12 years experience in on-site problem solving
- Wastewater reuse enabler
- **Winner of:** Intersolar Award 20**11**, SIEMENS Foundation empowering people Award 2019, IKU 2013,…

https://youtu.be/RI-XVr0m4n0

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Drinking water supply: Rural Tanzania

Conditions during rainy season

Solar Driven River Bank Filtration

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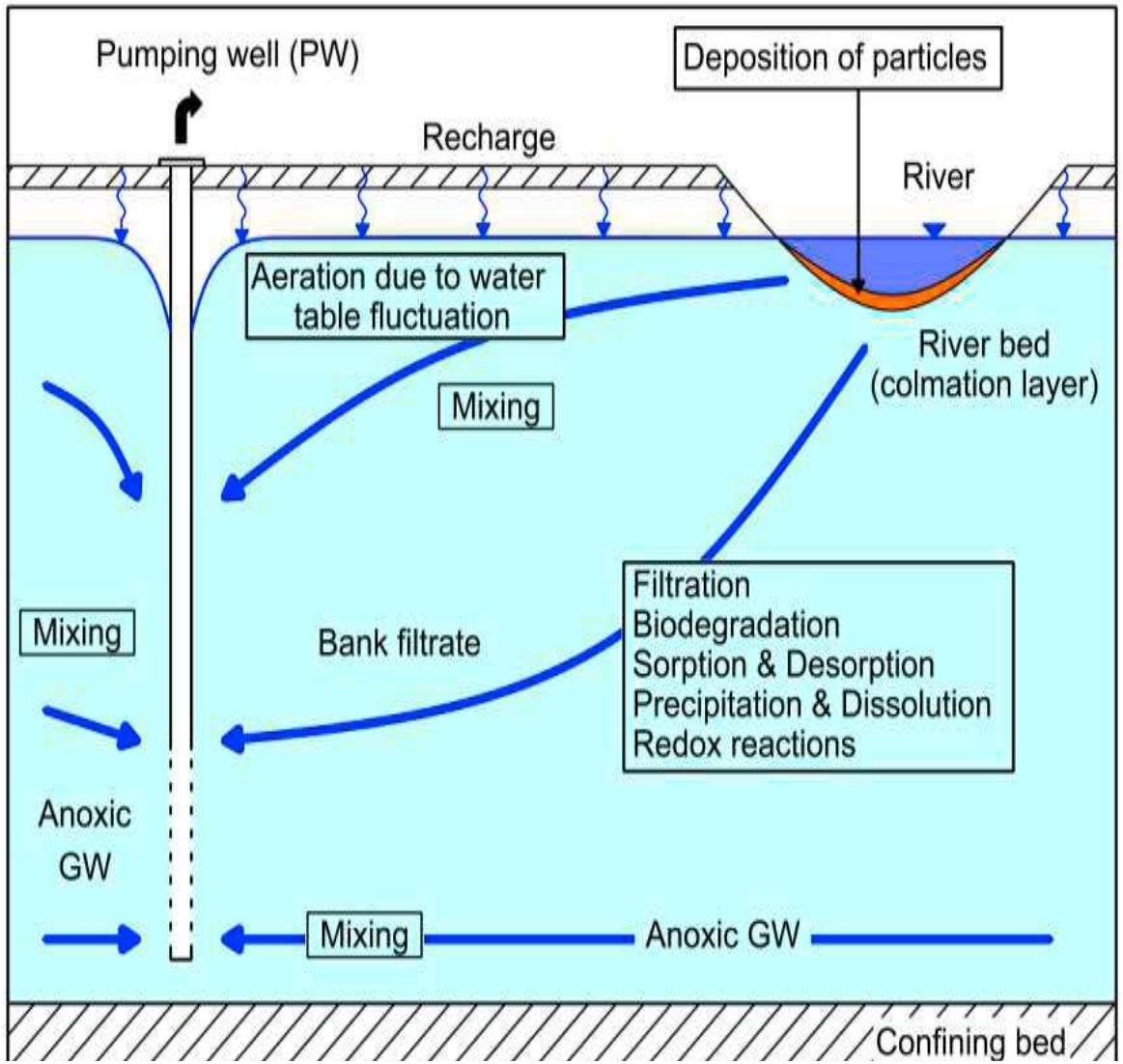
waterkiosk

River Bank Filtration – let nature do the Job



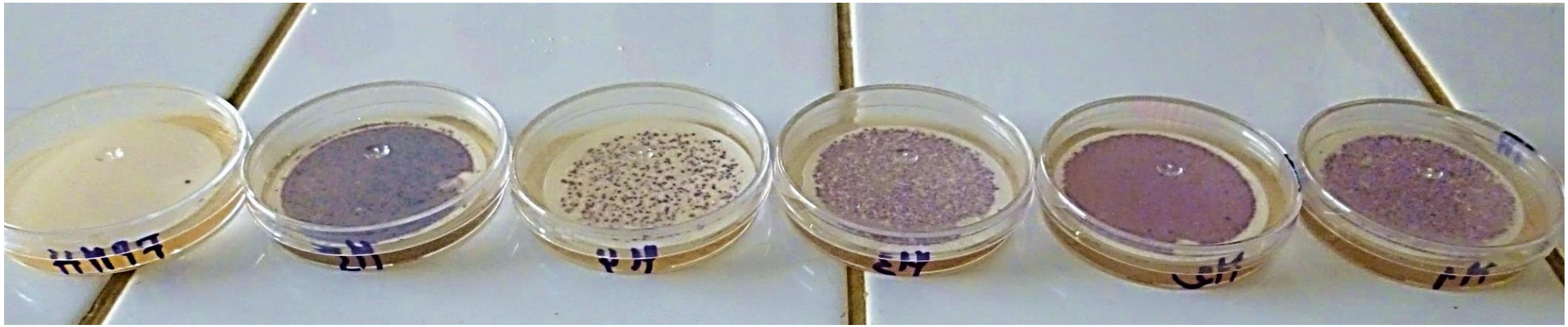
(Source: Paufler, 2017)

Safe drinking water supply?

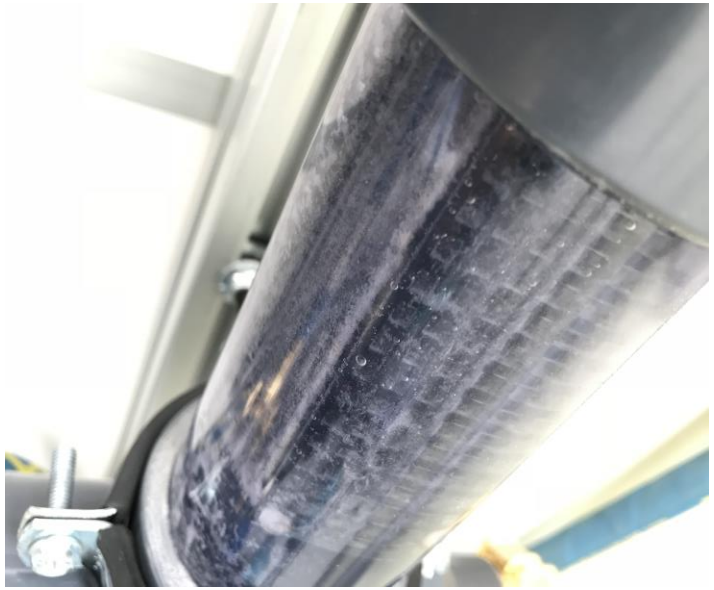
How good are improved water sources?

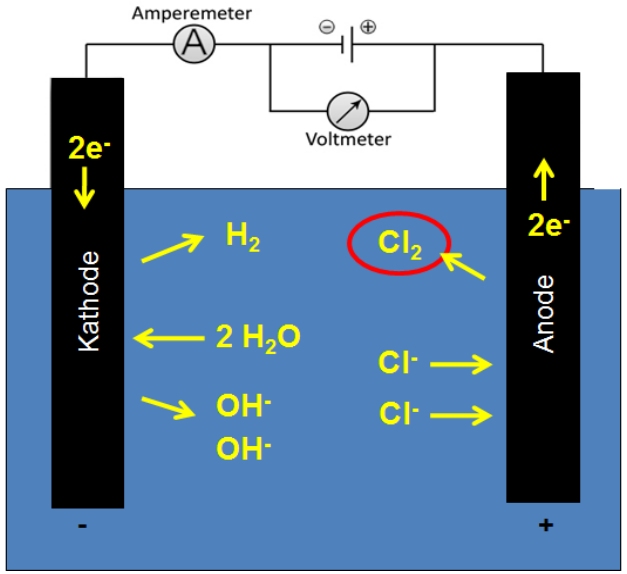
Foto: by Calvin Ndumwa

Improved Water Source = Safe Water?



(Source: Letzner, 2015)





- UV, membranes, boiling etc. not sufficient!!!
- Chlorination is indispensable!!

Our Solution SuMeWa|SYSTEM

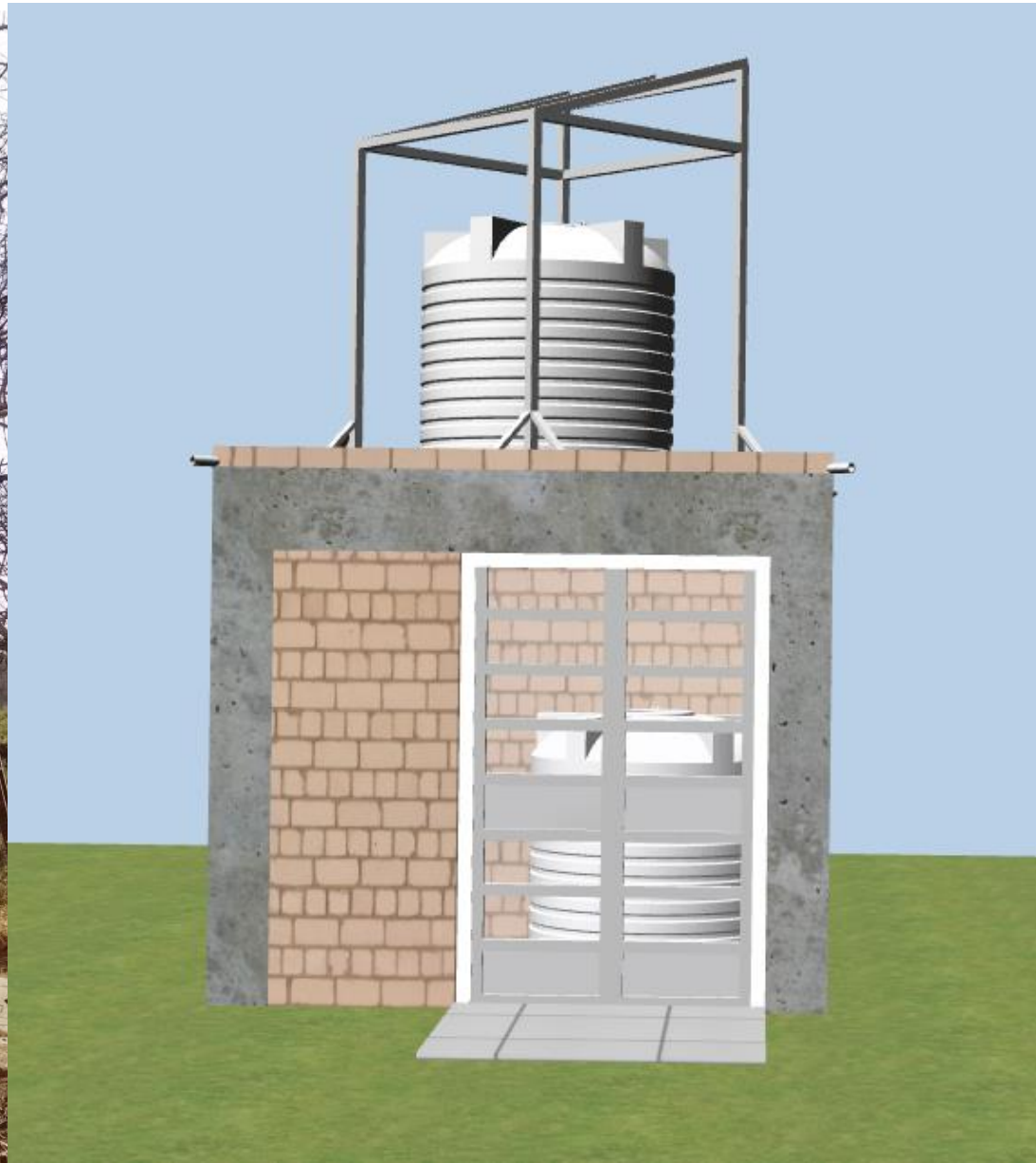
- Onsite Chlorine Generation via electrolysis

Solar driven disinfection

- Onsite chlorine production from **NaCl** and solar generated electricity (**4 Wh/m³**)
- Residual disinfection for up to 1.000 m³/d **(4 kWh/d)**
- Turbidity removal (RBF or media filtration)
- Iron, manganese and arsenic removal
- Wastewater reuse enabler
- Advanced oxidation for emerging contaminant removal

Treatment stations example Tanzania

Treatment stations example Kenya



Pilot station in Maharastra for 6.000 capita

Upgrading village water supply in India

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Bundesministerium
für Bildung
und Forschung

CONNECT
Education Research Innovation

Example Nigeria Public Health Centers

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Technology is only 20% of the solution

Business model based on prepaid water

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Offline/online water credit recharge

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waterkiosk

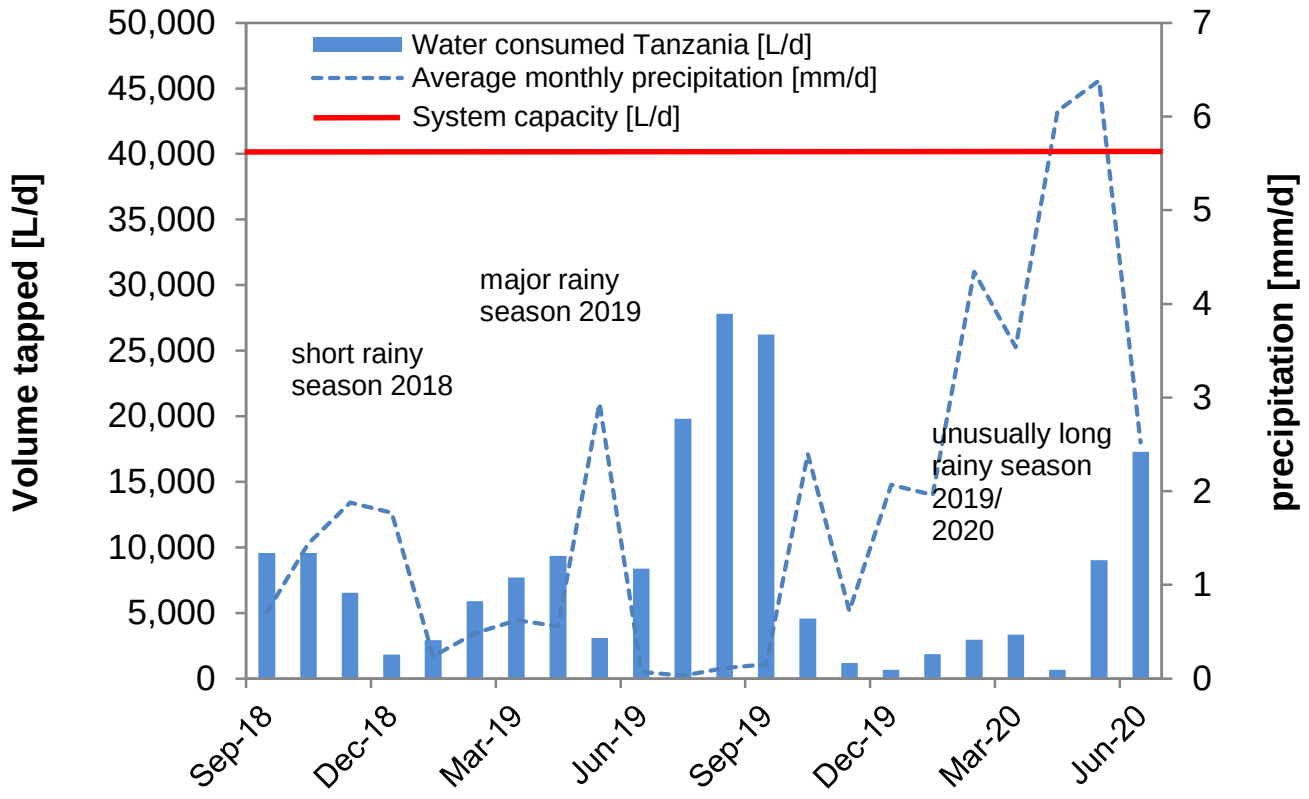
Simple tapping – solar driven

Prepaid Water Tapping

Can a station pay for its O&M?

Water price in rural region: 0.001 – 0.01 €/L → 1 – 10 €/m³

Business killer – overestimation



Job creation through delivery service

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waterkiosk

Job creation through delivery service

Conclusion solar driven rural drinking water supply

- Solar PV facilitates installation for off-grid water infrastructures (more cost efficient)
- Nature based (pre-) treatment should be favored against technical solutions
- **Water treatment requires expertize and experience**
- **Residual disinfection is a must in water distribution**
- Sound business model (pay per volume) required (consider less water sold as a fact)
- Combination of decentralized water and energy supply technology!

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Pure. Simple. Solid.

Thank you very much!

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