Federal Ministry of Food and Agriculture

Training course on solar powered fish hatchery operation, Bunda College
March 12th 2019

"Ich liebe Fisch" – *Improving Community Health-Nutrition Linkages through Solar Energy Based Fish and Crop Integrated Value Chains*

Dr. Sebastian Rakers
Fraunhofer EMB

Fraunhofer EMB

Federal Ministry of Food and Agriculture

Project in brief

Call: Research cooperation for global food security and diversified agriculture for a balanced nutrition in Sub-Saharan Africa

Title: *Improving Community Health-Nutrition Linkages through Solar Energy Based Fish and Crop Integrated Value Chains*
- "ICH LIEBE FISCH" -

Partners:

1. Fraunhofer Research Institution for Marine Biotechnology and Cell Technology (EMB) (Coordinator)
2. Gesellschaft für marine Aquakultur mbH (GMA)
3. Lilongwe University of Agriculture & Natural Resources, Aquaculture and Fisheries Science Department (LUANAR-AQF)
4. Lilongwe University of Agriculture & Natural Resources, Department of Human Nutrition and Health (LUANAR-HNH)
5. Lilongwe University of Agriculture & Natural Resources, Department of Food Science and Technology (LUANAR-FST)
6. Quantum for Urban Agriculture and Environmental Sanitation (QUALIVES)
7. Innovative Fish Farmers Network Trust (IFFNT)

Duration: 01.03.2016 – 30.09.2019 Budget: 1.3 Mio €, funded by Ministry of Food and Agriculture

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Fish production and supply in Malawi

Traditional food in Malawi is fish!

>100 years aquaculture is used in Malawi, with currently around 6000 small farms

2016: ~150.000 t of fish harvested by fisheries and aquaculture, but just 7500 t belongs to aquaculture (whereof 50% produced by Maldeco & Chambo Fisheries Malawi)

Production capacity is not sufficiently used because of low-grade feed (maize bran)

Today *O. karongae*, „Chambo“ is not affordable for most people in Malawi

Malawi lake: until 1990ies 70% Chambo (big ones), today they make less than 5%, 70% of sold fish belongs to Usipa (*Engraulicypris sardella)*

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Project aims

The following project aims are in focus

1. Establishment of a solar energy based hatchery to improve the supply of O. karongae fingerlings
2. Broodstock selection and production of "all-male"-fingerlings
3. Practical trainings for application of Integrated Aqua-Agriculture (IAA) and simple Aquaponics systems (Barrelponics)
4. Research on health status, nutrition habilities and economic status of families in rural areas before and after the project measures
5. Realisiation of training courses to communicate expert knowledge and capacity building in rural areas
6. Support of network establishment as well as a knowledge platform to foster exchange between the participating communities/farmers

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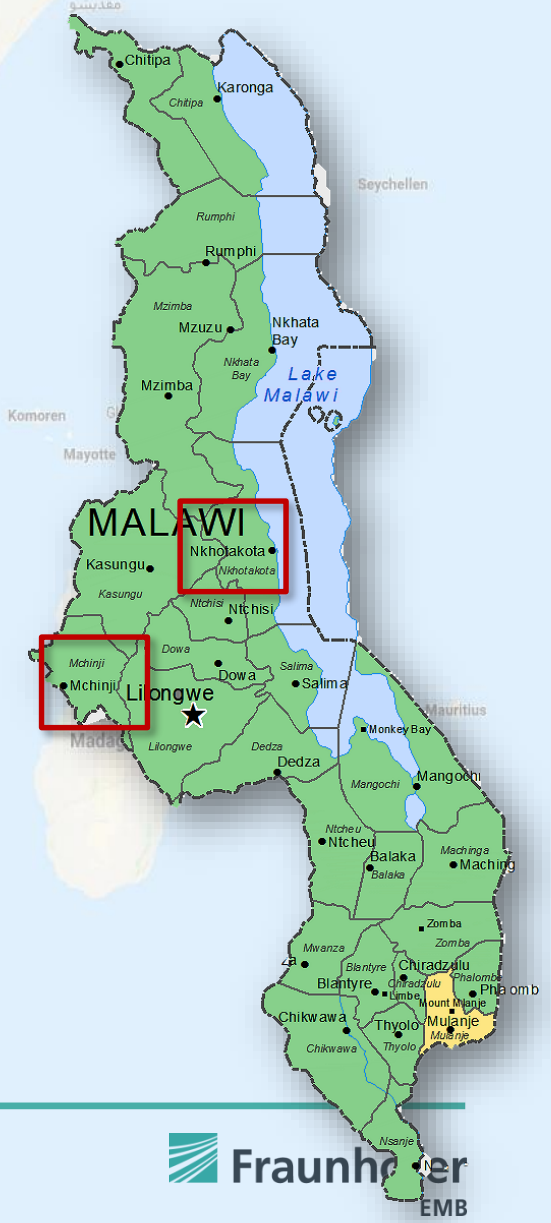
Implementation of project aims "Grass-root level"

- Communities from two different regions have been selected (one at Lake Malawi, Nkhotakota and one inland, Mchinji)
- Substantial support for communities by the project, e.g. through fish and seedlings, feed, fertilizer, etc..as well as by intensive mentoring and trainings
- Scientific supervision of the measures within the project is performed by german (EMB & GMA) and malawian partners (LUANAR, Qualives, IFFNT)
- Hatchery was constructed as "Template" to „train„, a central facility for training courses



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Project aim 1: Construction of solar energy based hatchery

Result of lacking fingerling production: „rice instead of fish…“

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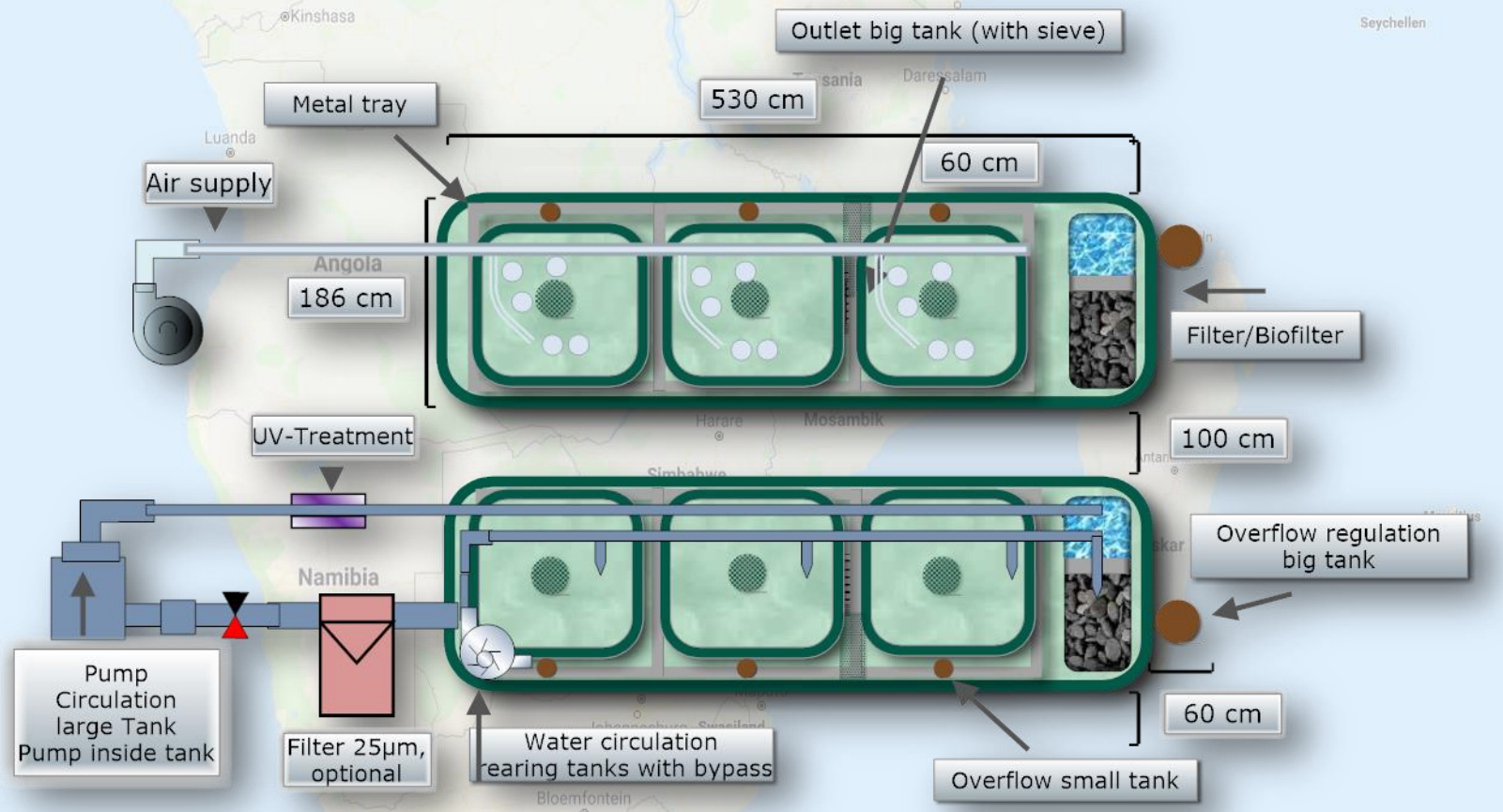
Project aim 1: Construction of solar energy based hatchery

Hatchery Design Malawi



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Project aim 1: Construction of solar energy based hatchery

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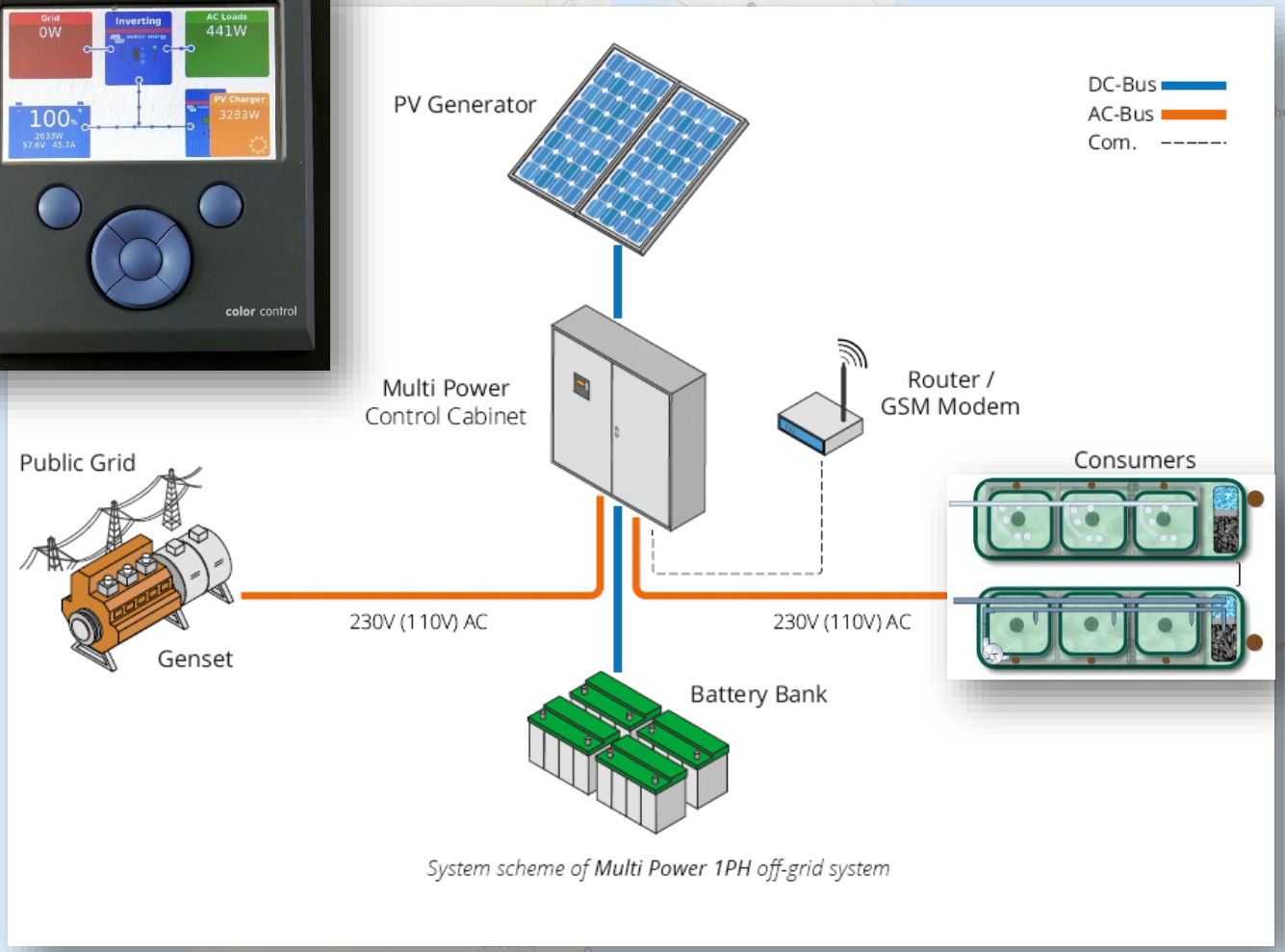

*System scheme of **Multi Power 1PH** off-grid system*

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Project aim 1: Construction of solar energy based hatchery

After Indoor-Phase the juveniles will be placed into Hapas and grow to sizes of 10-20 g (fingerlings)

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Project aim 1: Construction of solar energy based hatchery

Ponds will be fished to collect fingerlings

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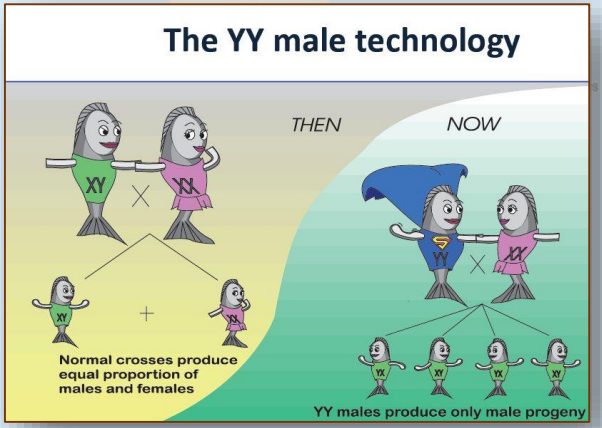
Project aim 2: Improvement of performance local tilapia species by efficient breeding conditions, broodstock selection and production of "all-male" fingerlings

- Sampling of several hundred wild broodstock fish populations at different places and brought to Bunda, where performance (growth, number of eggs, vitality, survival, etc.) was measured
- Fin clips collected for DNA analysis and genetic characterization
- "All male" populations desired: Experiments on production of homozygous YY-males and hybridisation experiments performed



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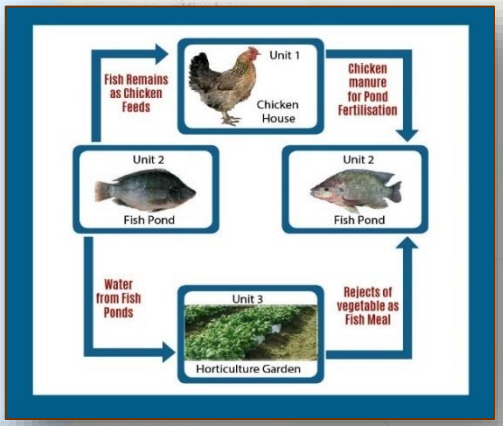
Project aim 3: application of integrated Aqua-Agriculture (IAA) and Aquaponic to use the nutrients produced by the fish for plant breeding and reduce the demand of water for the vegetable production



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Project aim 3: application of integrated Aqua-Agriculture (IAA) and Aquaponic to use the nutrients produced by the fish for plant breeding and reduce the demand of water for the vegetable production

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Project aim 4, socio-economic component: research on health status and nutrition of families in rural areas, especially of children and older people, as well as economic status before and after project measures

- Project start: questionnaire performed
- Follow-up after end of the project

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BASELINE SURVEY QUESTIONNAIRE

NOVEMBER, 2016.

QUESTIONNAIRE NUMBER:

INFORMED CONSENT MODULE: REQUEST FOR CONSENT

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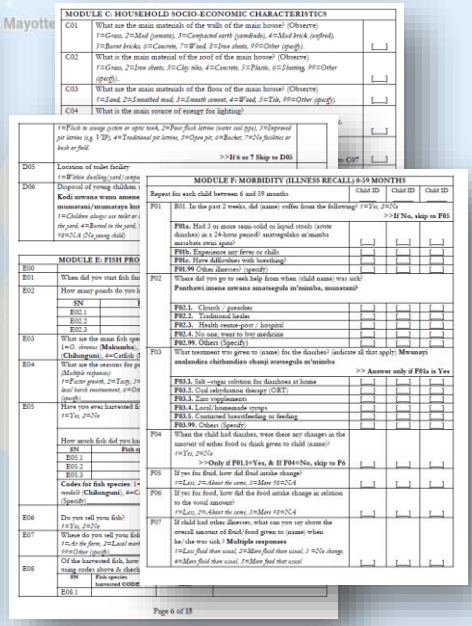

MODULE C: HOUSEHOLD SOCIO-ECONOMIC CHARACTERISTICS

MODULE E: FISH PRO

MODULE F: MORBIDITY (ILLNESS RECALL) 0-59 MONTHS

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Project aim 5: conduction of training courses

Presentations about Aquaculture and commercialisation

Nutrional consultation for mothers

Methods for low-loss fishing

Pond set-up

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Project aim 6: establishment of a network and kwowledge platform to foster expert and knowledge exchange between farmers and communities

www.fish-for-life.org

Under construction

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Achievements (03/2019)

- ✓ Solar energy based hatchery is constructed and in operation!
- ✓ Around 100 households took part of first survey on health status and nutrition of families
- ✓ Since 2016 - now 11 training courses performed (~450 fish farmers from 19 farmers clubs in Nkhotakota and Mchinji participated; around 80 women and children participated in course on nutrition)
- ✓ 2016 & 2017 35.000 fingerlings have been distributed to communities, together with high-valued feed; in 2018 51.000 fingerlings have been distributed
- ✓ Seedlings for pumpkin, rape, amaranthus, mustard and chinese cabbage for IAA usage distributed and succesfully grown
- ✓ Cooperation agreements with other organisations active in Malawi like WorldFish, GIZ, and with a churchly mission in Nkahotakota, the Benga Parish;
- ✓ 4 Masters thesis finished/ongoing (topics aquaponic, feed quality, genetic characterisation and broodstock selection, optimization larval breeding of O. karongae)

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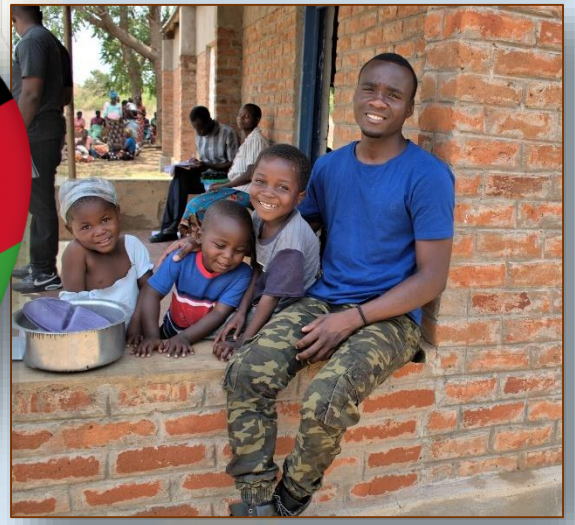
further Info: www.fish-for-life.org



Thank you for your attention!