

BOMOSA

Sustainable high-protein food through low-scale aquaculture



International

The BOKU-coordinated project BOMOSA (BOKU University Vienna, Moi University Kenya and Sagana Aquaculture Centre) has just been completed. Its objective was the integration of a special cage fish farming system in reservoirs, ponds and temporary water bodies in Eastern Africa.

Text: Herwig Waidbacher

Aquaculture is a major contributor to securing food for low-income developing countries. It offers a much-needed and affordable source of high-quality animal protein if the farmed species are produced using low-cost and sustainable farming methods. There are still concerns over potentially negative environmental, social, and economic impacts associated with aquaculture. These concerns relate to the mass production of commercial and/or capture-based aquaculture. By contrast, the BOMOSA project is only concerned with small-scale, cage-based aquaculture. The targeted benefits of the BOMOSA project are aimed at community level food security and poverty alleviation.

Scientific and Technical Objectives

BOMOSA is the name given to the “hub and plot” cage-based fish farming system that was prototyped in 2003-2004 especially for East African conditions. The net-like BOMOSA cages can be folded, easily transported and handled by two persons without mechanical aid. The INCO project will technically optimize this prototype system and the whole BOMOSA fish farming scheme to prove its economic viability and social acceptability, as well as determine requirements for an institutional environment to support broad uptake of the BOMOSA scheme in Eastern Africa.

BOMOSA Project

Financed by the European Commission (INCO-DEV, FP6)

Volume: 1.5 M Euro

Duration: Oct. 2006 – Sept. 2009

Coordinated by BOKU University Vienna, Austria

Coordinator: Herwig Waidbacher,

Project manager: Silke Drexler

4 partners in Europe from Italy,

Czech Republic, Austria

6 partners in Africa from Kenya,

Uganda, Ethiopia.

Link

BOMOSA www.bomosa.org

Aquaculture development in Eastern Africa

Inland aquaculture is generally under-developed in Eastern Africa, which is mainly due to four problems addressed by BOMOSA-based solutions:

Lack of knowledge and know-how

The BOMOSA hub and plot systems are unique in Eastern Africa. The technical know-how however does exist. The project researches requirements and conditions for economic viability, social acceptance and supporting institutional environments.

Lack of suitable fish species

BOMOSA will only utilize non-exotic species such as Nile Tilapia and African Catfish, which are deemed for local consumption, not export markets.

Lack of hatchery development – poor fish seed availability

BOMOSA “plots” will be located near a fish farm allowing supply and transport of fingerlings.

Lack of markets

BOMOSA will utilize a participatory approach to assess factors of social acceptance and employ capacity building measures to assist development of local markets, so that fish production will generate benefits at community and regional levels.

The BOMOSA scheme is intended as a network of small-scale, locally-run operations, whereby rural communities will set up and run the plots both during and after completion of the research project. For that reason, the project S&T objectives are also related to fulfillment of locally and regionally defined socio-economic targets such as demands and preferences, integration with existing farming and other economic activities, ethics and the roles of women rather than being based purely on achieving fish productivity targets.

Kenya, Uganda and Ethiopia share common problems in sustainable management of sensitive and dynamic ecosystems, as well as facing deficits in high protein food supply and an ongoing battle to alleviate rural poverty. The BOMOSA scheme uses an existing fish farm (“hub”) to supply fingerlings for rearing within suitable water bodies such as reservoirs, ponds and naturally occurring temporary water bodies formed during the rainy season. Farmers are trained to rear the fish in cages in their “plots” and then harvest them for fresh consumption, to sell locally or to process for long-keeping. The fish will be a

high protein dietary supplement and/or an additional source of income for subsistence farmers.

The BOMOSA project offers extensive research with the following scientific and technical objectives:

- Apply a participatory approach to define targets in terms of economic viability and social acceptability at community level for the new BOMOSA plots.
- Develop and validate an evaluation method using remote sensing to assess and characterize water bodies for use as potential BOMOSA plots.
- Set up fourteen BOMOSA plots and optimize the technology in three types of small (less than 5 ha.) water bodies within four ecozones across Kenya, Ethiopia and Uganda.
- Evaluate locally available, agricultural by-products and cost-effective processing technologies as a resource for sustainable production of low-protein fish feed.
- Determine requirements and make recommendations for a legal and regulatory framework based on potential veterinary, public health and environmental impacts of BOMOSA.
- Develop capacity building and dissemination material for the local community, relevant authorities and policy makers as well as the international scientific community.
- Develop a socio-economic model for sustainable introduction and widespread uptake of the BOMOSA scheme in Eastern Africa.

Feed technologies as a research challenge

While the term “intensive aquaculture” is generally used for operations relying on solely high-protein feed compounds, the BOMOSA concept can be classified as a semi-intensive cage-based aquaculture, which involves the provision of all, or almost all of the nutritional requirements through the use of “farm-made” feeds. This avoids one of the most heated debates concerning aquaculture development, the use of fishmeal and other animal proteins in aquafeeds. As the BOMOSA project aims to utilize mainly temporary water bodies or at least those with significant seasonal fluctuation, a diet of blended feeds is necessary to achieve growth rates allowing harvest size within 4-7 months. Therefore, the BOMOSA project focuses the feed research efforts – with intensive participation of Werner Zollitsch – on the development of low protein feeds based on processing and blending locally available agricultural by-products on a technological level suitable to East African conditions.

Most aquaculture production in developing countries is semi-intensive and small-scale with nutrient inputs supplied in the form of fertilizers and supplementary “farm-made” aquafeeds; the latter ranging from the use of fresh plant cuttings, silages, cereal by-products, through to sophisticated on-farm pelleted feeds. BOMOSA farm-made feeds allow small-

scale farmers to tailor feed inputs to their own financial resources and requirements, and use locally available agricultural by-products which would otherwise have limited use.

“Honestly, it is quite rare to have such direct interaction in international research projects.”

Mario Scalet, scientific officer in Brussels

Environmental and public health issues

Given the small scale and the decentralized locations of BOMOSA plots, the accumulative environmental impact of non-consumed feed and generated fish waste is expected to be ecologically sustainable by the water body. It is an area of research within the project to determine the optimum stocking densities of fish per m³ of cage and ratios of cage to water volumes with consideration of seasonal water fluctuations and ecozone characteristics. Veterinary, environmental and public health issues, along with ownership and other potential conflict issues will shape the recommendations for developing an institutional framework in close cooperation with African national fisheries authorities.

Dissemination and public reactions

The BOMOSA technology itself is rather simple, which makes it particularly suitable for African conditions. Strong interest has come from communities, public decision makers and top-ranked politicians. Several ministers and parliament members from Kenya and Uganda as well as the Austrian president Heinz Fischer have already visited established “plots.”

The EAAWA (East African – Austrian Water Association with 210 members from seven countries) has taken notice and started dissemination of the BOMOSA concept. EAAWA is interlinking various institutions and multiplied synergy effects are expected due to the direct linkage of experts/actors from higher education, research, implementation and the policy sector.



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Austrian president Heinz Fischer and wife visiting a BOMOSA plot