

Policy Briefing

How can smallholder aquaculture producers in Malawi improve their yields and profitability?



The AgriTT programme is an innovative trilateral initiative between the UK Department for International Development (DFID), the Chinese Government, the Governments of Malawi and Uganda and the Forum for Agricultural Research in Africa (FARA). The programme facilitates the sharing of successful experiences in agricultural development with developing countries to improve agricultural productivity and food security.

AgriTT Pilot Development Projects work with small farmers, agricultural outreach agencies and policy-makers in Malawi and Uganda to introduce agricultural technology innovations from China and embed these in a value chain, of which farming communities will be the primary beneficiaries. **The Malawi Pilot Development Project** supports the development of the tilapia aquaculture sector.

 Agricultural Technology Transfer

Delivering an effective package for technology transfer to smallholder farmers

There are over 7,000 smallholder fish farmers in Malawi (GoM, 2015). The aquaculture sector has experienced a range of different initiatives by government, donors and NGOs, but most farmers continue to struggle to improve their production and profitability levels. To address this, the AgriTT Malawi Pilot project 'Grow Out' component has introduced Chinese table-sized fish production technologies and practices to a selection of Malawian fish farmers.

The Malawi AgriTT pilot project demonstrated a set of technologies and practices that can significantly increase yields. These approaches were tested on-station at the National Aquaculture Centre (NAC), and on-farm with 25 grow out farmers, and consisted of the following best practices:

- Construction of large, deep ponds that are on average 1,000 square metres (m²) and 2 metres deep. These allow improved water conservation, temperature regulation and limit the effect of predation.
- Utilisation of improved feeds, whether locally produced or purchased
- Predation control methods such as pond fencing and screening ponds for frogs and tadpoles
- Use of partial harvesting technique - only harvesting fish that have reached a specified size

- Use of feeding trays
- Stocking of 6 fish per sqm
- Use of correct manuring rates
- Use of all-male fingerlings as seed
- Integration of aquaculture with other farming activities
- Record keeping and basic good practice business processes

The use of these practices proved extremely successful with evidence of yield increases from a baseline of 1.5 metric tonnes (MT) per hectare (ha) to up to 6 MT/ha.

25 semi-commercial smallholder farmers were identified to test the improved production technology, after one growing season this was scaled up to 100 farmers, some operating at lower commercial scales. All participating farmers attended a training course (with technical and business development modules), which was followed up by regular technical backstopping visits to their farms by District Fisheries Officers (DFOs), staff from the NAC, and the Chinese Technical Assistants (TA). The test farmers were supported with access to improved feed, production equipment and high quality fingerlings.

All farmers attended a technical demonstration open day and a week-long farmer to farmer knowledge exchange field trip. All DFOs have attended several training sessions on how to work with farmers, and encourage uptake of best-practice technologies. Production manuals have been produced to support the continuation of activities by the DFOs after the project has phased out.

AgriTT activities have demonstrated that smallholder fish farmers in Malawi require significant face to face support in order to understand and actively take up new practices and technologies.

Regular visits over the course of a number of seasons are required if farmers are to adopt a new technology. Support to the DFOs as well as directly to farmers by the AgriTT Malawi Pilot project has therefore been critical as it is the DFOs who will offer future support to the targeted farmers.

Support to fish farmers must go beyond technical training to address knowledge gaps in running effective fish farming businesses. There is a

widespread lack of understanding of simple business practices, such as record keeping and calculating profit margins and this ultimately leads to poor investment in aquaculture and a perpetuation of low yields and profitability. In some cases, a smallholder fish farmer simply does not have the capacity to reach the semi-commercial level and targeted support must be offered to such individuals, depending on their aspirations.

Based on initial results from grow out farmers, uptake of recommended practices show evidence of delivering improved yields*:

Farmer Categorisation	Average no ponds	Average AgriTT pond size (ha)	Potential / realised yield (kg/ha)	Feed Conversion Ratio
Semi Commercial	3.61	0.16	4175.39	1.5
Subsistence / small-scale	2	0.08	2031.78	2.01

**Based on data from initial 25 grow out farmers. Some farmers did not undertake compete harvest at time of writing therefore potential harvest / yield calculation used. Harvest calculated by multiplying no of fingerlings stocked by average weight of fish at last sampling, with 10 per cent mortality.*

Policy recommendations

- **Use of deep and large ponds, use of all-male fingerlings with greater stocking densities, and use of improved feed with appropriate feeding regimes are all practices that show great potential to improve the productivity of fish farmers.** These AgriTT grow-out technologies have proved to be very effective at improving yields. These approaches should continue to be demonstrated by government and development partners over the course of several seasons and through different market conditions, especially as technical backstopping is eased.
- **Technology transfer needs to be supported by a strategy for commercialisation of the sector, which creates an enabling environment for private sector investment.** The availability of low cost quality feed (alongside the use of high quality fingerlings) is crucial if the uptake of improved technologies is to be effective and result in improved productivity. Establishing viable feed and fingerling supply chains is critical for sector development.
- **Promotion and publicity of the technologies developed under the AgriTT pilot project should be targeted at mid-scale entrepreneurs** as this will facilitate commercially based growth of the aquaculture industry.
- **The involvement of mid-scale enterprises at all levels of the aquaculture value chain is crucial for the development of the industry** and is an area largely ignored to date. Future projects could consider focusing on the development of aquaculture agribusinesses such as feed distributors or traders and distributors of table sized fish. An aquaculture challenge fund mechanism could be considered.



Thanks to the AgriTT Malawi Pilot project we now have the tools and technologies to kick start sustainable development in the aquaculture industry, but to do this we need a clear strategy for aquaculture commercialisation.

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