

Policy Briefing

The challenge of producing high quality fingerlings in Malawi



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

Supporting improved fingerling production

The smallholder aquaculture sector in Malawi is not yet fulfilling its potential as a business sector. One of the key reasons for this is poor access to high quality fingerlings. Production of high quality fingerlings is constrained by inadequate infrastructural capacity and poor knowledge of effective technologies. Access to improved fingerlings is in turn limited by the geographic reach of current production centres.

AgriTT Malawi pilot project activities centred on enhancing the capacity of the National Aquaculture Centre (NAC) and its satellite stations to produce greater volumes of high quality fingerlings. The focus was two-fold; building skills and knowledge through resident staff working side by side with the Chinese Technical Assistants (TA), and improving infrastructural capacity directly related to fingerling production.

The overarching aim of the AgriTT fingerling production activities was to explore and prove which Chinese production technologies can work optimally in the Malawi context. Developing high quality fingerling production capacity is imperative as it is the basis from which the sector can develop.

Key achievements of the AgriTT fingerling production activities are as follows:

- Two million male fingerlings have been produced at NAC, a doubling of productivity at the centre.
- Using an improved feeding regime and better management, a 95% fry to fingerling survival

rate has been achieved; the previous rate was only 75%.

- Department of Fisheries (DoF) technical assistants collaborated with the Chinese TA on a daily basis to ensure effective knowledge transfer.
- Infrastructure improvements have included installation of a bio-filter and greenhouse at NAC, construction of rearing tanks at Mzuzu Research Station and installation of an indoor hatchery at Kasinthula Research Station.
- All District Fishery Officers (DFOs) were trained in improved fry and fingerling production and extension techniques
- Technical manuals for DFOs on fry and fingerling production have been produced.
- Twenty farmer hatchery operators were supported by AgriTT, and trained in a model of pond based multiplication.
- Creation of a network of regional producers that can improve accessibility to fingerlings throughout Malawi. Support was mainly in the form the regular advice and guidance from NAC and the Chinese TA but also through the supply of basic equipment such as hapa nets.

Results indicate that an efficient pond based and greenhouse system is the basis for effective mass production of fry and fingerlings to meet market demand. Use of all male fingerlings can deliver higher yields and profit margins for grow out farmers; this method should be promoted where possible.

The pond based multiplication approach, using ponds and tanks, and ideally combined with greenhouse technology to give better temperatures in the cold season, has been demonstrated by the AgriTT Pilot Project as an effective and appropriate model for fingerling production in Malawi. The method has delivered substantial productivity gains at NAC and is optimal because of its low energy and investment requirements, and because it is relatively easy to learn, operate and scale out to new producers. In contrast, the infrastructural, financial and human resource capacity of most Malawian fingerling producers is not compatible with very intensive hatchery based production systems. Hatcheries can be costly to maintain and to operate, particularly where electricity supply is a problem. Intensive systems also require skilled management to ensure appropriate temperature, oxygen and

water levels to avoid sudden mortalities.

All male fingerling production using the hybridisation method is recommended as the most effective method for high quality fingerling production in Malawi.

The hybridisation method involves cross breeding *Oreochromis shiranus* and *Oreochromis karongae* to produce all male offspring. It is an effective alternative to hormone treatment as it has a male production rate of 80% and yet does not require the import of expensive hormones.

The management of satellite stations and farmer hatchery operators takes substantial effort and resources.

For this model to work, a long-term strategy of support needs to be in place to ensure that challenges in technology adoption are addressed and production protocols are carefully followed. At farmer level, it must be ensured that there is sufficient business management capacity in place to manage the operation.

Policy recommendations

- **Nationally, a range of fingerling production methods should be in place. Hatchery production is optimal but given the high costs, the need for reliable power, and the management complexity of hatchery based models, greater emphasis should be placed on pond based production.** Where pond based models are promoted, adequate technical backstopping must be available; good predation management, appropriate stocking regimes and fry removal practices must be implemented. The use of greenhouse technology is recommended to boost production rates.
- **To ensure the production of high quality fingerlings, the use of all male production technologies is imperative.** All male fingerlings have quicker growth rates meaning production cycles are shortened thus improving profit margins. Hybridisation technology has proved successful and is appropriate as hormone treatment is expensive and is not permitted at farmer level. The hybridisation technology will require capacity building of farmers and testing on-farm before roll out.
- **Future projects should work with a few prominent farmers to further test and demonstrate a viable business model in hatchery operations.** Publicity is needed to encourage medium / larger scale farmer entrepreneurs to become hatchery operators where robust markets exist.
- **Hatchery development initiatives should give careful consideration to location.** Temperatures need to be suitable for fingerling production, and the viability of distribution models and target markets need to be assessed.
- **There is need to focus on facilitating the establishment of viable private sector fingerling producers, and sustainable markets for fingerlings.**



The Malawi aquaculture industry is highly dependent on the production of high quality fingerlings, among other factors. Here at NAC we now have the knowledge and capacity to produce such fingerlings and meet the needs of aquaculture producers throughout Malawi.

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