

### Aquaculture and food security in Solomon Islands

*Pacific Island countries and territories (PICTs) are some of the most vulnerable nations to climate change. Growing populations, combined with climate change and overfishing of inshore reef fish, will compound food security problems arising from an increasing gap between fish demand and supply. Along with some other PICTs, Solomon Islands recognises the need for new sources of fish to meet future food security requirements. Options include fish imports, increasing access to offshore tuna fisheries such as with inshore fish aggregating devices, and aquaculture development. The Government of Solomon Islands has identified inland aquaculture as one means of addressing the gap between fish supply and demand.*

The Australian Centre for International Agricultural Research project “Aquaculture and Food Security in the Solomon Islands” was formulated to assist the Government of Solomon Islands in better understanding the future demand for aquaculture; in particular, to “develop a strategy to guide future development of sustainable inland aquaculture to support food security and secure livelihoods for the Solomon Islands in response to rising populations and climate change”. The project was implemented through a partnership of three agencies: The WorldFish Center, the Solomon Islands Ministry of Fisheries and Marine Resources (MFMR) and SPC’s Aquaculture Section.

Initiated in 2010 and completed at the beginning of 2011, the project included wide-ranging consultations with stakeholders, fish-farm site visits and field work, social survey work, and application of GIS techniques to find out the opportunities and challenges for inland aquaculture in Solomon Islands as a way of addressing food security challenges. Major findings of the project include:

- Future scenarios for fish supply-and-demand suggest that significant investment in aquaculture is required to ensure food security in Solomon Islands.
- Tilapia is the only food fish farmed in Solomon Islands. There is a market demand for tilapia, that is expected to continue to grow as urban populations expand and acceptability of the species increases.
- Existing tilapia (*Oreochromis mossambicus*) and farming systems are insufficient to meet future fish demands. While some small yield improvements to present farming systems and practices may be possible, if tilapia is to remain a priority fish for food security, then it will be necessary to introduce a more productive species such as Nile tilapia (*Oreochromis niloticus*).
- Inland pond farming of Nile tilapia is technically feasible, and environmentally suitable sites exist within Solomon Islands.
- Farming of a native fish species is a further option. Milkfish (*Chanos chanos*) is the most obvious candidate but, unlike tilapia, it is not yet ready and requires further research, especially to establish the localities and seasonality of milkfish fingerlings in the wild for possible capture-based culture.
- A formal analysis to assess ecological risk and identify risk management measures is advocated, and the Solomon Islands government should take this into account when making any decision on the importation of an improved strain of Nile Tilapia. This is

now being addressed through a separate initiative guided jointly by SPC, WorldFish Center, MFMR and the Pacific Regional Environment Programme. Milkfish is native to Solomon Islands and, thus, requires no import risk analysis.

- Investment in farming of improved strains of Nile tilapia, milkfish or a combination of the two species appears to provide opportunities for viable businesses, from household to larger scale commercial enterprises. Low-cost fish production systems will be needed for the product to remain competitive in markets and benefit poorer consumers.
- Investment in a combination of smallholder household enterprises, school ponds, and small to medium enterprises, plus supporting infrastructure, institutions and policy, could benefit consumers and households in rural and urban areas.
- An annual production of 2,500 tonnes of food fish will require investment in infrastructure and operating capital. Preliminary estimates suggest that at least USD 1.2 million in farm construction and infrastructure and USD 2.6 million/year in operational funds will be required, but will generate over USD 3.7 million/year in farm-gate sales, plus employment and improved food security.
- Some elements for inland aquaculture in Solomon Islands are in place, but are incomplete.



*There are an estimated 50 household ponds for Mozambique tilapia in Solomon Islands, all characterised by low yields because this variety of tilapia is not suitable for aquaculture. However, these households are enthusiastic about culturing fish.*

- Further investment in research, strengthening of institutional and regulatory capacity and partnership building is required to develop systems and bring together the skills and resources necessary for responsible growth of inland aquaculture.

In conclusion, aquaculture production of fish appears to be a necessary component of future food security in Solomon Islands, and market demand and opportunities exist for competitive inland aquaculture enterprises. Based on the findings of the ACIAR project, an integrated approach based on five major themes will be necessary to move forward. Implementation will require bringing complementary skills and investments together via partnerships, involving both public and private sectors.

### 1. Improving fish yields and productivity

Aquaculture for food security requires a species other than Mozambique tilapia; one that can deliver higher yields competitively under culture conditions. An indigenous species may be used if suitable, or if tilapia is preferred, then an improved species such as Nile tilapia must be imported. Low-cost pond input options need development (feed, fertilisers, use of byproducts, management systems). Farming systems, management practices and business models require elaboration for different enterprise types.

### 2. Building skills and organisational arrangements

Inland aquaculture will require people with technical farming skills, as well as necessary business, management and marketing skills, with actual requirements depending on the scale of operation. Aquaculture extension and knowledge dissemination systems will need to be developed to impart skills to farmers and businesses. Assisting interested households with organising into more economically efficient “clusters” needs investigation, along with possibilities for mutually beneficial links between households and medium and larger aquaculture enterprises and value chains (e.g. contract nursing, farming, input and output markets).

### 3. Access to finance for infrastructure and operations

Inland aquaculture will require access to investment; in pond construction and associated water supply and drainage, possibly roads for larger enterprises and seed, feed, labour and other routine operational costs. Nile tilapia will require additional investment in hatchery infrastructure. One central publicly controlled Nile tilapia broodstock nucleus and quarantine facility will be required to receive and manage imported Nile tilapia, with trained people and sustained financing. Such an investment in milkfish may not be necessary initially, should trials confirm that wild seed is available in sufficient quantities for farming; it may be necessary in the longer-term, however.



*Apart from introducing a more productive strain of Nile tilapia, aquaculture of an indigenous species can be investigated. Milkfish (Chanos chanos) is one of the few candidate species with some potential, although it needs research.*

### 4. Market access

Existing marketing systems and value chains could absorb some increased household production of tilapia, but more organised systems of marketing will be needed as tilapia or milkfish farm production increases. Marketing strategies that enable access by poorer consumers also need further investigation.

## Public policy and institutions

A conducive public policy environment and the development of regulations will be needed to support the implementation of 1–4 above. Investments in institutional strengthening — such as staff training and operational budgets — will be needed for national and provincial government management of aquaculture.

Land use, site selection criteria and spatial plans should be prepared to support medium-scale investments in inland aquaculture. Particular attention will need to be given to the existing land use and ownership patterns, with reference to customary land use norms and conditions.

The key activities indicated in this article are a basis for follow-up work to take these ideas further. These will be scrutinised by partners in order to develop an appropriate strategy and investment plan for inland aquaculture development in Solomon Islands. A national advisory group containing representation from households, public and private sectors may be considered to facilitate progress.

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