AFGRP Success Stories:

Where the DFID Aquaculture and Fish Genetics Research Programme is making a difference

Shabji Rani survives by working in the fish market

A case study on the impact on livelihood of a cleaner working in a fish auction market in Dinajpur, Bangladesh

"Those days were the hardest of my life, when my husband died and we had to struggle for food and clothes. Luckily the fish arot (auction market) was established at that time and the hat (local market) started growing. Fortunately I got a job as a cleaner at the hat. We survived that time and now we are doing very well."

These are the heart-felt words of Shabji Rani, working as a cleaner of the fish auction market at Ranigonj Hat, Dinajpur.

Shabji was born, brought up and now lives close to the Ranigonj Hat. She is illiterate and does not know how old she is, but knows she married at about 14 years old. Now her family consists of 7 members including her daughter (already a widow), son, grandsons and granddaughters. She was living happily with her husband until he died five years ago. Then lack of food and money became a problem. She went to different people looking for work but it was not easy to get and she struggled for months.

Fortunately the fish auction market was established at around that time (1999-2000) to cope with the growing trade in fish, especially locally cultured species.

Cleaner taking fish for retailer called "Tola"

Shabji got the job of cleaning the market and has been employed since. Interestingly, as with other market cleaners, she does not get a salary, but rather gets paid by individual stallholders in the form of a "Tola". Tola means that she takes one handful of products from each of the sellers' stalls.

Every day she cleans the market, especially the fish auction area, before the auction starts at 6am. After cleaning she waits at the market until the farmers come with their fish and the auction starts. Once the auction starts she takes her Tola (50-200g fish) from each farmer or retailer. On a typical auction day she gets about 2.0-2.5kg of fish of different species. She keeps about 1kg for household consumption and sells the rest, usually at low prices to neighbours. Twice weekly on public market days she also takes Tola from vegetable and rice retailers. Thus cleaning the market she gets fish for consumption seven days a week and earns about US$8 per week. This amount is about half of the family income. More importantly, during the lean period of rice and vegetable supply her family live on income from the fish auction market. Without the sales of farmed fish in the market, the family would suffer from food scarcity during the lean periods.

This income has enabled Shabji to extend her house and buy a television set. Many of her neighbours come to watch TV, so they maintain good relations with her and thus she receives help from them. She hopes that fish production in the area continues to grow so that when she is no longer able to work her son will do the cleaning and continue to support the family.

Project R8286 is looking at the impact of production and marketing of freshwater aquatic products on rural livelihoods. Find out more at www.dfid.stir.ac.uk/afgrp/projects.htm

Developing country partner to partner technology transfer and effective resource utilisation

In the first year of the project (2001-2) Research Institute for Aquaculture #1 (RIA#1) developed fish sperm cryopreservation protocols for common carp sperm and have applied these methods to creating a cryopreserved sperm gene bank for several stocks of the species in Vietnam. This gene bank will be a valuable resource for conserving genetic variation of stocks, particularly those for unique "indigenous" stocks being used in traditional upland aquaculture, which are being threatened by the widespread dissemination of improved varieties.

The protocols developed for common carp were themselves extended to other species of carp within the Vietnamese component of the project, but towards the end of this year the technology was extended to the project partners at the University of Agricultural Sciences (UAS) in Bangalore. Due to the absence of the skilled staff from RIA#1 (studying in Japan) the technology could not be transferred directly but a trained member of staff from the Asian Institute of Technology was able to travel to UAS and train the project staff there. Within days the operation was working like a well oiled machine and within one week a cryopreserved sperm gene bank of some 100 fish, representing all six of the base strains used to initiate the selective breeding programme for the species in India, had been frozen down. Technology transfer was achieved with local staff being able to apply the Vietnamese developed protocols on their own by the third day.

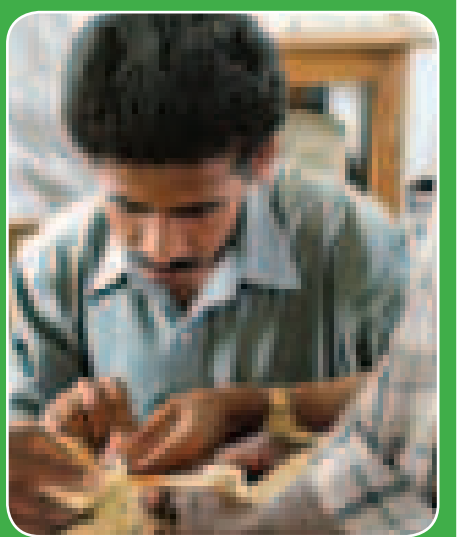
The portable controlled freezer enables precise freezing protocols to be applied in the basic hatchery environment. The sperm gene bank itself will help to conserve the genetic diversity within the individual stocks, supplementing the live gene banks already being maintained by the University and the DoF, which is acting as a research partner. Another application for the cryopreserved sperm gene bank will be in estimating genetic gains from the selective breeding programme that has already been initiated through the creation of a synthetic base population, which is being reared for selection both on-station and on-farm within

Karnataka. A protocol was developed whereby eggs from future generations of selected females (1 2, 5, 10 or more generations/years down the line) can be fertilized with sperm from the base population males. In principal, the difference in performance (for growth, the trait under selection) between the progeny produced using the cryopreserved base population sperm and the progeny from the same females, fertilized with sperm from the same generation of selected males, should represent half of the total genetic gain from selection.

This protocol addresses one of the main constraints of any selection programme, that of maintaining a control against which genetic gains can be assessed. To maintain a random bred control can utilize almost as many resources as the selection programme itself and where resources are limited, as will be the case in Karnataka, this creates a major dilemma which should be solved by the use of the cryopreserved sperm gene bank now created.

This is an example of technology development and transfer between developing country partners within an AFGRP project which will ultimately contribute to assessment of the long term impact of project outputs on carp production efficiency in India which itself will contribute to the overall assessment of the project impact upon livelihoods of rural fish farmers.

Project R7590 is researching the genetic status and improvement strategies for exotic carps for low input aquaculture in Asia. Find out more at www.dfid.stir.ac.uk/afgrp/projects.htm



Sperm was collected directly from live gene banks held at the FRSH

Risk issues and socio-economic impact associated with BNP in *Pangasius* spp. farmed in Mekong Delta, Vietnam

Identification of the bacterial pathogen causing outbreaks of BNP in Vietnam was a considerable success. Previous attempts had been made to identify the cause of the disease where poor quality samples and a haphazard approach to disease diagnosis had lead to strange and misleading results. Application of simple yet effective sampling methodology produced good quality results where a single bacterial species was consistently recovered from BNP infected catfish. The sampling methods were applicable to fish of all ages and were applied to animals in infected river-based cages and earthen ponds. The diagnostic approach appropriate to Vietnam included a case history of the farm infected, microbial sampling as well as pathology interpretation. A pattern quickly emerged, where infected animals had the same clinical signs, only the same single bacterial species was recovered and consistent pathology was observed. This was substantiated further as non-infected fish from the same pond or cage gave no clinical signs of disease, or non-significant bacterial recovery and no pathology was detected. From the data generated the pathogen was identified as the bacterium *Edwardsiella ictaluri* and a case definition of the disease was produced. This provided new knowledge on a significant fish health problem within a rising aquaculture industry.

Frequently, when discussing disease outbreaks with farmers or extension officers a wide range of clinical signs are provided. Often these are not very specific and many samples must be taken before any attempt can be made in identifying the problem. This can be time consuming and frustrating for the fish farmer who needs to know what action to take with his stock. The case definition of BNP helped Vietnamese diagnosticians take appropriate samples, thus reducing wastage of time and resources and helped them make informed decisions about the fish disease problem encountered by the farmers. If a positive case definition was suspected, then samples for bacteriology and histopathology always gave isolation of the bacterium *E. ictaluri* together with a very consistent pathology interpretation. Clinically, the isolation of *E. ictaluri* from BNP-infected *Pangasius hypophthalmus* in Vietnam was important, as this was the first report that this bacterium had caused a significant health problem outwith the channel catfish industry in the USA.

Uptake of the simple sampling methodology has now been applied elsewhere, outside of the immediate research collaborators and has been adopted by other Vietnamese researchers, some extension services and University students. More in-depth evaluation will be done but it is clear that by providing simple yet reliable tools in fish disease diagnosis, effective decisions can be made in fish health management applicable at the farm where information generated may help influence policy decisions.

Project R8093 is assessing risk issues and socio-economic impact associated with outbreaks of Bacilliary Necrosis Disease (BNP) in *Pangasius* spp. farmed in the Mekong Delta, Vietnam. Find out more at www.dfid.stir.ac.uk/afgrp/projects.htm

Internal clinical signs of BNP-infected farmed *Pangasius hypophthalmus*, Vietnam. Note presence of white spots in the liver, kidney and spleen.