



Fish from the main flow of the Mekong provide a significant food source for half the population of Laos.

PHOTO: BRAD COLLIS

FISHWAYS BREAK DOWN THE BARRIERS

Fish in the Mekong River provide food security for millions of people. However, thousands of weirs on the river's tributaries and flood plains are preventing fish from reaching vital breeding grounds. Fish passageways may hold part of the answer to the problem

BY MANDY GYLES

The Mekong River, and its highly productive flood plains, flows life through Lao PDR, providing water for irrigation, transport and replenishment of soil nutrients, and its fish sustain the livelihoods of millions of people.

The Mekong supports the world's largest inland fishery, with an annual harvest of 2.2 million tonnes, equivalent to 2% of the total global catch. In Laos alone, most of the country's six million people fish, mainly in the Mekong and its tributaries, and fish are by far the most important source of animal protein and calcium.

However, thousands of weirs on the flood plains are preventing the movement of migratory fish between the rivers and their breeding and nursery habitats. While necessary for other aspects of life in Laos, the barriers result in reduced fish yields because the highly productive wetland habitats are not available to the fish. An ACIAR fisheries project may now provide a solution to this dilemma.

ALLOWING FISH MIGRATION

In many areas of the world fish-passage facilities, such as fishways or fish ladders, maintain pathways past artificial barriers for migratory fish in order to prevent population decline. However, to date, fish-passage

management guidelines have been poorly defined in Laos and other Lower Mekong countries.

In Pak Peung village, in Bolikhamxay province, the success of an ACIAR-funded fishway pilot project suggests that constructing vertical slot fishways could provide a useful management tool for rehabilitating floodplain wetland fisheries in central Laos.

Fishways allow fish to pass around a barrier by swimming through a series of gaps or slots that control the speed of water flow. The experimental vertical slot fishway installed at a floodplain regulator in Pak San allowed more than 2,000 fish from 50 species to successfully gain passage in the first two weeks of the

experiment.

The Lao director of capture fisheries, Douangkham Singhanouvong, says the project team is focusing on small-scale weirs, less than about six metres high. "In the future, we will encourage engineers to include fishways in the design of all new weirs."

AUSTRALIAN TECHNOLOGY

The Australian project leader, Dr Lee Baumgartner, a freshwater fish ecologist based at Industry and Investment NSW's Narrandera Fisheries Centre, has been working on the A\$150,000 project with scientists from Laos's Living Aquatic Resources Research Center, the National University of Laos, and Queensland Primary Industries and Fisheries.

"Fishways have been widely constructed in Australia and are very effective at facilitating migration of native fish past weirs. However, in Laos there are no functional fishways," Dr Baumgartner says.

He concedes that the few fishways that have been built in the Mekong have performed poorly because they were based on fishway designs that did not consider the behaviour and swimming ability of local fish species.

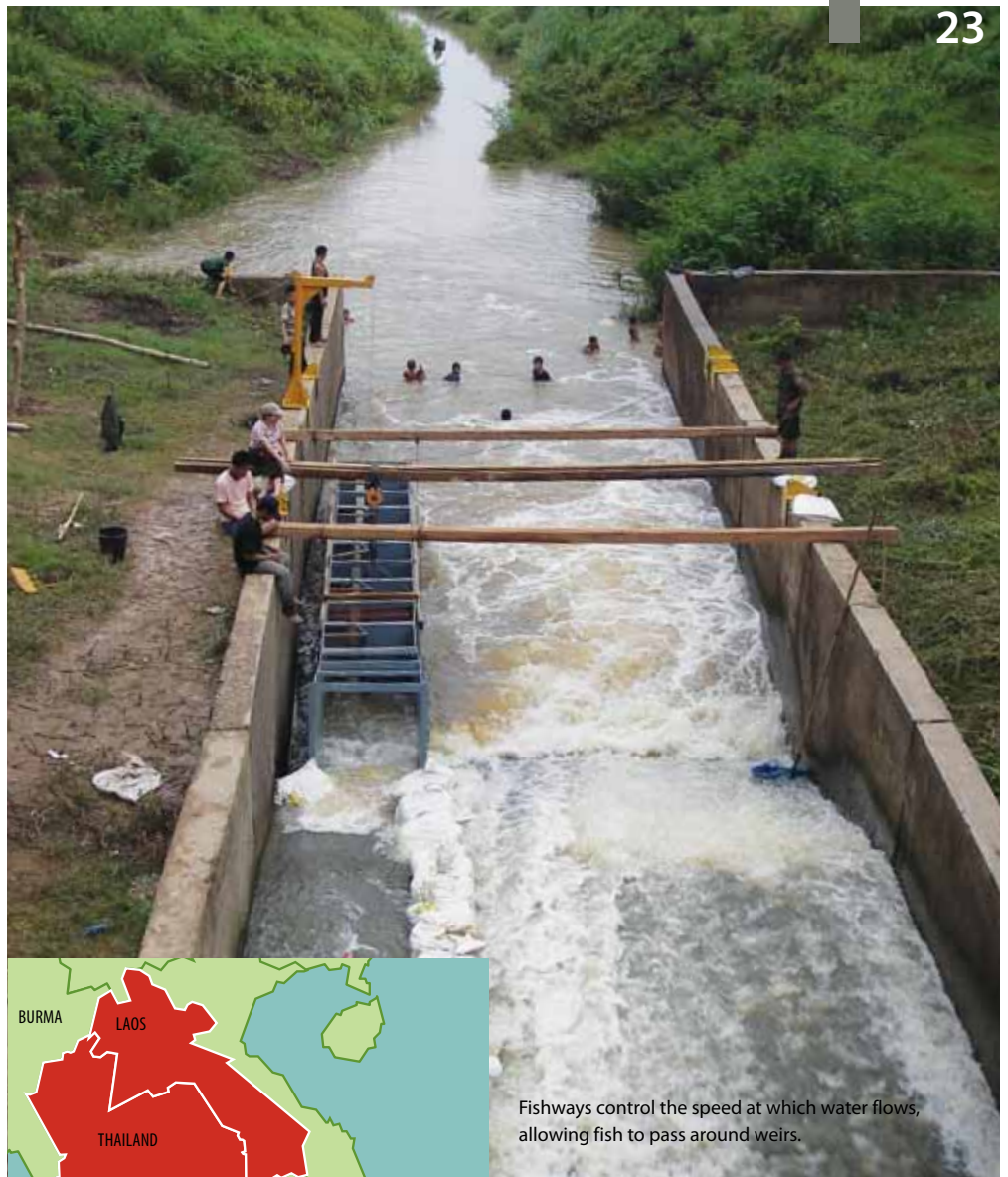
"Each weir on a river that is targeted for fishway construction is unique. Fishways need to be designed to cater for the physical characteristics and swimming abilities of the local fish community. Typically, smaller species of fish are weaker swimmers and are unable to negotiate faster flows. The hydraulic conditions within a fishway therefore need to provide both enough depth for large fish while ensuring the velocity is suitable for smaller fish," he says.

During the recently completed ACIAR project, the scientists installed an experimental fishway on a known migration barrier and used it to determine the maximum swimming speed of the fish in the Mekong River. They are now installing a permanent fishway structure based on the experimental outcomes.

"So our first step with fishways has been to develop appropriate design criteria and demonstrate their effectiveness for fish in the Mekong Basin," Dr Baumgartner says.

"With increased understanding of local fish species' swimming ability and behaviour, local design criteria can be applied and adjusted so that successful fishways can be built. However, the higher the passage, the greater the challenge and our work is generally applicable for barriers less than six metres in height."

Dr Baumgartner says the research has application in Australia. "Although most Australian fishways are successful for large



Fishways control the speed at which water flows, allowing fish to pass around weirs.



PARTNER COUNTRIES

Laos, Thailand

PROJECT: FIS/2006/183: Development of fish-passage criteria for floodplain species of central Laos

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fish species, scientists have had significant trouble assisting the migrations of very small fish species. Small species are abundant in the Mekong River, so we hope information generated from the research will allow the construction of more efficient fishways in Australia."

THAI INVOLVEMENT

The Thailand Department of Fisheries has also gained much recent experience with fish-passage technology through previous biological assessments undertaken at Pak Mun and trap and transport fishways at other sites of key significance in the Mekong Basin.

Hydropower dams and fish in the Mekong

ACIAR's fisheries research program manager Dr Chris Barlow was previously chief technical adviser for fisheries at the Mekong River Commission, based in Vientiane, Laos, for nine years. He stressed that fishways are not the solution for the problem posed by large dams.

Dr Barlow said fish passageways can be used to help fish migrate upstream around low barriers like weirs, but they are not a realistic solution for overcoming the barriers posed by large dams like those being built for hydro-electricity.

Thai fisheries researchers are collaborating with Lao and Australian scientists to value-add to the existing assessment of fish passage in Laos. These collaborative efforts will be used to consolidate existing work in the wider Mekong regions and to develop a plan to improve opportunities for fish passage at the estimated 10,000 low-level barriers to fish passage in Thailand and Laos, and farther downstream in Cambodia and Vietnam. ■