



Catch and Culture

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Editorial



For many years the migratory habits of some of the Mekong's largest fish have fascinated scientists. Now a group of researchers from the Mekong Wetlands Biodiversity Programme (of which the Mekong River Commission is a partner) and the National Geographic Society have joined forces to undertake a year-long study into these fishes and their migration paths and spawning sites. But there is something special about this study - it will be the first attempt to use underwater biotelemetry to track fish movements in the Mekong. Working with Thai and Lao fisheries officers, the researchers will tag fish and use receivers floating in the water to track their movements.

The importance of community fisheries has long been something advocated by the MRC Fisheries Programme and in this issue of *Catch and Culture* we take a look at developments in Cambodia. Promotion of community fisheries has been an important step in giving users the ability to co-manage local resources in conjunction with the national government, but the communities need to be given the power to manage the fisheries if they are to succeed.

Cambodia's fishers have much in common with their neighbours in Lao PDR, but the Lao fishers are facing a new challenge with the recent improvements in road transport between international borders. This, combined with improved fish storage and the use of more efficient fishing gears, is putting pressure on the fishery of Siphandone. There is also concern that practices are hindering upstream and downstream migrations and fishers are calling for the government authorities in both countries to coordinate actions to improve transboundary management of these fisheries.

With fish so vital to the Cambodian economy it is only right to give the fish a day of their own, so it was no surprise when Prime Minister Hun Sen and several cabinet ministers joined in the celebrations this year. Cambodia's National Fish Day marks the beginning of the closed season for large and medium scale fishing and the Prime Minister emphasised the importance of adhering to this ban if Cambodia is to preserve its rich resources for the future.

Lao PDR is also thinking about the future - by breeding and nursing indigenous species to ensure their survival in the wild. To date, the Living Aquatic Resource Research Centre in Vientiane has succeeded in breeding seven species, and now research has moved to Champassak Province where researchers have easier access to mature female fishes. Already the researchers have been successful in producing tens of thousands of larvae from red-tail catfish and small-scale river carp and now seem to be achieving good results with a third species.

Also in this issue you can find the latest information products from the Fisheries Programme and a round up of fish stories in the international news. We hope you enjoy your reading.

The Editors

Fish migration studies using biotelemetry

By Zeb Hogan and George Naughton



The project team attached the transmitters to bamboo rafts built by local fishers. Photo: Alvin Lopez, MWBP

Research project focuses on Mekong giant catfish and other large species

The Mekong Wetlands Biodiversity Programme and the National Geographic Society have launched a one-year study of fish migrations in the Mekong Basin. As the first large-scale attempt to use underwater biotelemetry to study fish migrations in the region, the project could help identify threats to aquatic fauna and develop strategies for people who depend on the river for their livelihoods.

Working with Thai and Lao fisheries officers, the project aims to determine migration patterns and spawning sites of wild Mekong giant catfish

(*Pangasianodon gigas*). It also plans to study the behaviour of captive-bred fish of the same species. A third objective is to capture and tag other large species to identify migration patterns and critical habitats. These include the giant catfish (*Pangasius sanitwongsei*), the second-biggest migratory catfish in Southeast Asia, and the goonch (*Bagarius yarrelli*), a Silurid catfish native to the Mekong and also found in India and Indonesia. Other species include Bocourt's catfish (*Pangasius bocourti*), sharp-nosed catfish (*Pangasius conchophilus*), Asian red-tailed catfish (*Hemibagrus wyckioides*) and giant sheatfish (*Wallagatu*).

In late April, the project team installed 17 receivers along a 100 km reach of the Mekong between the Golden Triangle and Pa Dai, the most downstream point on the Thai-Lao stretch of the Mekong before it completely enters Lao territory. Another two receivers were installed about 200 km downstream at the mouth of the Ou River near Luang Prabang. Most were attached to bamboo rafts built by local fishermen. The transmitters which were attached to the fish each broadcast a unique digitally-coded signal, allowing recognition of individual fish. Receivers in deep, slow-moving water generally seemed to have higher detection rates than those in shallow-fast-moving water.

Fish were kept in the river and anaesthetised before tagging. For smaller wild species and hatchery-raised giant catfish, transmitters were surgically implanted. Larger fish were tagged externally as their bigger dorsal spines made attachments easier and more secure.

The ease of implanting transmitters and reactions to surgery differed between species. The hatchery-reared giant catfish were not obviously stressed during surgery but had extremely tough skin and thick

¹The Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme (MWBP) is a joint programme of the four riparian governments of the Lower Mekong Basin - Cambodia, Lao PDR, Thailand and Viet Nam - managed by the United Nations Development Programme (UNDP), the World Conservation Union (IUCN) and the Mekong River Commission (MRC), in collaboration with other key stakeholders.



A *Bagarius yarrelli* is released after it has had a transmitter attached. Photo: Alvin Lopez, MWBP

muscle tissue. In general, tag implantation was difficult for this species and difficulty increased with size. The goonches (*Bagarius yarrelli*) did not seem overly stressed by capture or surgery either but were prone to excessive bleeding. The red-tailed catfish reacted well to surgery and seemed to recover relatively quickly after tagging. But the giant sheatfish was difficult to sedate and required longer exposure to the anaesthetic.

The most noticeably adverse reaction to capture and tagging was seen with the Bocourt's and sharp-nosed catfishes. All tagged fish from these two species appeared outwardly healthy except for damage to their skin and mucus layer. But the fish reacted violently when we attempted to place them in the sling and continued to struggle when sedated. During surgery, the fish usually underwent a series of spasms. These species seemed to recover well after surgery and could swim on their own when released. But the stress may reduce their chances of survival.

Overall, the team tagged and released 21 wild fish including a 200 kg Mekong giant catfish (see accompanying article). The average weight of the

other 20 wild fish was 7.3 kg. These included 10 goonches, five red-tailed catfish, two sheatfish, another two Bocourt's catfish and one sharp-nosed catfish. The team also tagged and released 18 hatchery-reared Mekong giant catfish fish in two groups. The first group suffered high mortality rates as they were recovering from surgery. The second group was transported to the river before surgery and placed in a holding pen. After the tagging team had implanted transmitters into the second group of fish, the fish were placed back in the holding pen to recover, after which they were released in the Mekong River.

The team plans to download data from the receivers on a monthly basis until May next year. Initial results indicate that many of the tagged hatchery fish moved downstream after being released and that at least one of the wild fish made a significant upstream movement of more than 30 kilometres. Initial indications support the hypothesis that northern Thai-Lao stretch of the Mekong may be connected to Myanmar and China by one broad-scale migration pattern.

Wild Mekong giant catfish killed after tagging

By Zeb Hogan

Working with Thailand's Department of Fisheries and ex-Senator Tuenjai Deetes (see *Catch and Culture*, Volume 12, No. 1), a MWBP-National Geographic Society team bought, tagged, and released a Mekong giant catfish in Hat Khrai village in Chiang Rai province on May 11. Purchased from Lao fishermen, the fish weighed about 200 kg and was the first acoustically tagged wild adult giant catfish ever released into the mainstream Mekong. The event was a milestone in a very long and complicated process involving many stakeholders and almost 10 years of preparation.

Released in honour of the 60th anniversary of King Bhumibol's ascension to the throne, the fish seemed healthy but weak as it swam away. Shortly after its release, however, the fish was caught and killed about 500 m downstream from the release

site. In its weakened state, the fish was unable to swim well and would have been easy to catch. Those who caught the fish, butchered it and threw the transmitter into the river, representing a major set back to the study of the ecology of giant catfish and a financial loss in excess of US\$3,000. Had the fish survived, it would have provided by far the best scientific information ever available on movement of wild Mekong giant catfish.

While the death of the fish was a disappointment to the project, Thai and Lao fishers have now agreed to stop fishing for the Mekong giant catfish. Discussions are ongoing about whether or not it will be possible to attempt another Mekong giant catfish migration study in the future.

Pangasianodon gigas

Family: *Pangasiidae* (shark catfishes)
English: Giant Mekong catfish
Khmer: *Trey reach*
Lao: *Pa beuk*
Thai: *Pla beuk*
Vietnamese: *Ca tra dau*

Pangasius sanitwongsei

Family: *Pangasiidae* (shark catfishes)
English: Giant catfish
Khmer: *Po pruy*
Lao: *Pa leum, pa ling*
Thai: *Tepa, lerm*
Vietnamese: *Ca vo co*

Bagarius yarrelli

Family: *Sisoridae* (Sisorid catfishes)
English: Goonch
Khmer: *Trey krawbey*
Lao: *Pa khae*
Thai: *Pla khae, pla khae ngua*
Vietnamese: *Ca chien bac*

Pangasius bocourti

Family: *Pangasiidae* (shark catfishes)
English: Bocourt's catfish
Khmer: *Trey pra kchau*
Lao: *Pa nyang, pa phoh hua*
Thai: *Pla yang, pla ai dong*
Vietnamese: *Ca ba sa*

Pangasius conchophilus

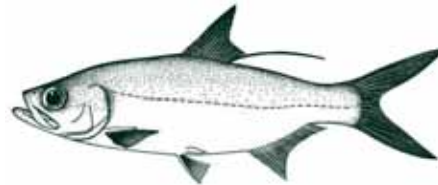
Family: *Pangasiidae* (shark catfishes)
English: Sharp-nosed catfish
Khmer: *Trey ke, Trey bra ke*
Lao: *Pa phoh, pa gaa*
Thai: *Pla poh, pla saai yu phueak*
Vietnamese: *Ca hu*

Wallago attu

Family: *Siluridae* (sheatfishes)
English: Giant sheatfish
Khmer: *Trey sanday*
Lao: *Pa khaow*
Thai: *Pla kao, pla kao khao*
Vietnamese: *Ca leo*

Scaling up community fisheries in Cambodia

By Alyne Delaney and Thomas Augustinus



Community fisheries in Cambodia need more authority if they are to succeed. *Photo: Joe Garrison*

Cambodia's decision to promote community fisheries has been an important step in giving users the ability to co-manage local resources with the national government. But to succeed, groups responsible for the fisheries must also be given the power to manage them

Community fisheries in Cambodia have the right and responsibility to control and care for local fishery resources. This means drawing up management plans that include conservation zones and helping to prevent illegal fishing and the cutting of flooded forests. Community fisheries also educate other stakeholders about their role and the roles and

responsibilities of local villagers. Many are in former commercial fishing lots (areas) along the Mekong, Tonle Sap, and Bassac rivers, although some are in reservoir areas and in Stung Treng province where there are no commercial lots. The fisheries are highly diverse according to when and how they were set up, which resources they depend on and whether they were formed from commercial lots.

Community fisheries are local but many of the issues they face are not, notably illegal fishing and fish migration. They may also lack resources and the ability to enforce rules and regulations. Issues affecting reservoir fisheries may be primarily local with little outside influence in terms of species migration or human influence. In a former fishing lot along the Mekong, however, fish and people migrating great

distances may have an impact on the fishery in addition to local influences and development activities far away.

The Department of Fisheries' Community Fisheries Development Office and its provincial units - along with the MRC, the Food and Agricultural Organisation (FAO) and the NGO-led Fisheries Action Coalition Team (FACT) - have done a tremendous job in forming more than 400 groups. But none have been recognised legally and much work remains to be done before all are functioning successfully. Under the Sub-decree on Community Fisheries passed in 2005, members have the right to accompany officers in seizing evidence of fishing violations and detaining offenders (see accompanying article on page 10). But the sub-decree does not provide community fishery members with the ability to stop illegal fishers personally. Instead, they rely on district police, fishery officers or commune councils to apprehend illegal fishers and confiscate gear.

Community fisheries do conduct their own patrols but their frequency is limited by financial resources. Some expenses could be met if community fishery committees could raise funds - by leasing out part of the fishing ground, for example. This already takes place but officially it is not allowed. The Department of Fisheries has been working to develop alternative sources of income but has not been able to reach all groups. Representatives of community fisheries in Lots 13, 14, and 18 on the Tonle Sap highlighted the need to patrol more often but say they are hampered by a lack of funds for fuel and boat rentals. Indirect costs include taking time off from fishing and reprisals from illegal fishers including damage to boats and pumps and even the killing of livestock.

Scaling up and being part of larger networks is one way for community fisheries to increase their powers. But both human and financial resources are needed to get all of them organised at the district, provincial, and national levels. While human resources could be

strengthened through further capacity building, financial resources could be partly met by commune councils. First elected in 2002 as part of Cambodia's effort to decentralise decision making, commune councils have budgets and mandates to protect and conserve the environment and natural resources. In many cases, however, the commune council does not understand its potential role in fisheries management. In other cases, other interests may be considered more important. Closer ties with the councils are nevertheless a great opportunity for community fisheries to influence other sectors of society.

In some areas, federations have been formed, mainly supported by FACT, the MRC and FAO. These allow members of each community fishery's committee to discuss issues of mutual interest such as illegal fishing by villagers from each other's fishing grounds. Federations also serve as a support in confrontations with powerful groups. The federation can achieve what a single committee can not. In areas where federations have not yet been formed, some committee members mentioned a desire to meet with other community fisheries but lacked the financial resources for regular meetings.

Scaling up community fisheries to improve management has great potential in Cambodia. Poverty and powerlessness may limit that potential. But in the absence of immediate solutions, understanding these issues is at least a first step towards addressing them so that all community fisheries have both the ability and power to manage their resources.

Acknowledgment

The authors work for the Institute for Fisheries Management and Coastal Community Development, based in Denmark. They wish to thank Sokunthy Prach, Southea Soun, and Vichit Meas of the Cambodian Department of Fisheries for their guidance and assistance during the field work; and John Kurien for discussions on the role of commune councils.



Market forces seen having strong influence on future of new system

Emerging challenges to Cambodia's reforms

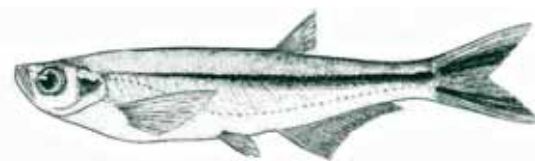
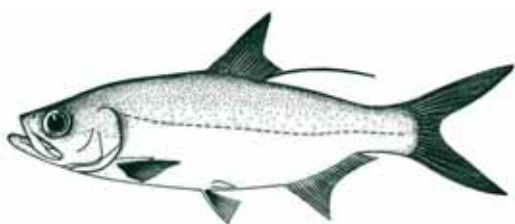
In 1999, Cambodia's Prime Minister Hun Sen decried the "anarchy in fisheries" that had arisen from various conflicts. A year later, he announced the release of thousands of hectares of fishing areas in commercial lots to local communities. By 2001, Cambodia had become the first country in Asia to have a dedicated Community Fisheries Development Office, leading to a Sub-decree on Community Fisheries Management issued last year (see accompanying article on page 10). But the Inland Fisheries Research and Development Institute (IFReDI) of the Cambodian Department of Fisheries says it's wishful thinking to assume that everything is now rosy.

A recent policy paper* published by the institute notes that transitions to new forms of rights are "always accompanied by fresh conflicts, new alliances, windows of opportunity and a variety of threats. In Cambodia's transition to community fisheries many of these possibilities are likely to emerge," it warns. "It will be wishful thinking to imagine that once legal status is attained, the new

rights to communities will be respected by all members of society." Being aware of the possibility of new social tensions and helping people to resolve conflicts locally is therefore expected to be a major task for government agencies and civil society groups.

As the economic activities of community fisheries expand, the paper's authors - John Kurien of India and Cambodian fisheries officers So Nam and Mao Sam Onn - expect markets to play a bigger role. "The material outcomes of the changed natural resource management will be strongly influenced by the forces of the market," the paper predicts. But it also warns that markets can sometimes result in producers being exploited (by creditors, for example). "The challenge is to make markets fair and people-friendly. This can be achieved only through community and state collaboration. Collective action bolstered by legislative support is the key."

* Kurien, J., So, N. and Mao, S.O. (2006) Cambodia's Aquarian Reforms: The Emerging Challenges for Policy and Research. Inland Fisheries Research and Development Institute, Phnom Penh, Cambodia. 32 pp.



What the sub-decree says

Under the sub-decree issued by Prime Minister Hun Sen in mid-2005, people who live in fishing grounds or nearby can voluntarily set up community fisheries. Members must be Khmer citizens and reside in the village where the fishing ground is located. They have to be committed to:

- managing inland fisheries and related ecosystems where fishing lots have been cancelled;
- managing fish resources in a sustainable and equitable manner;
- increasing understanding and recognition of fish resources through protection and management;
- providing a legal framework for community fisheries; and
- improving living standards and reducing poverty

Community fisheries can be financed by member contributions and donations as well as aid from the government, international agencies and non-governmental organisations. Other financing must be lawful. Members are obliged to follow instructions from the Department of Fisheries and help set up conservation areas. They are also responsible for guaranteeing equal rights to all members, implementing by-laws, making plans and reaching management agreements with the department.

Members have the right to accompany officers in seizing evidence of fishing violations and detaining offenders. But they cannot build anything inside community areas without permission from the Department of Fisheries. Nor can they partition or privatise community areas or enter into any agreements with outsiders - including agreements involving scientific research.

Each community fishery is supposed to be run by a committee of five, seven or 11 members elected by secret ballot for a term of five years. The person who wins the most votes becomes chief of the committee and the member coming second serves as deputy chief. Local fisheries officers and

commune council members can be invited to observe the election but their presence is not needed for the vote to take place.

Committees are the only bodies authorised to seek department approval of community fishing-area agreements lasting no more than three years. To draft an agreement, the committee can seek technical assistance from fisheries officers and other individuals. Agreements require a map on the scale of 1:50,000, a list of committee and other members, by-laws and regulations, and a statement of objectives. Draft agreements must be exhibited for 30 days in prominent public places and government offices in the local commune and district. Commune, district and provincial officials are responsible for dealing with any objections. The Department of Fisheries is responsible for approving requests for renewing agreements within 30 days of the agreements expiring. Agreements are automatically renewed if the department does not provide notification within 30 days.

Fishing-area agreements can be cancelled before they expire if the community damages local fishery resources by failing to implement the agreement or by violating its by-laws or regulations. Agreements can also be cancelled if the government decides that the area can be put to better public and social use, although this need six months written notice and requires the department to discuss community losses with the committee. In addition, agreements can be cancelled at the request of the committee and two-thirds of the members.

Committees that have had their fishing-area agreements approved can request technical assistance from fisheries officers to prepare a management plan. Such plans are valid for the same period as fishing-area agreements but have to be reviewed by provincial and district fisheries officers every year. Committee members are supposed to be involved in following up, monitoring and evaluating management plans. To ensure sustainability of fishing areas, the Department of Fisheries may require management plans to be revised in accordance with other legal instruments related to fisheries.

Source: *Inland Fisheries Research and Development Institute*

Lao-Cambodian fishery needs new management approach

By Thomas Augustinus, Wolf Hartmann, Alyne Delaney and Aloun Phonvisay



The fishery of Siphandone is facing problems as some fishers move from traditional practices to the larger gears which block entire streams. *Photo: Joe Garrison*

Recent improvements in roads, storage, transport, fishing gear and communications are boosting trans-boundary fish trade. But new threats are emerging, highlighting the need for coordinated management by both the Lao and Cambodian authorities and fishing communities on both sides of the border

The fishery of Siphandone near the Lao border with Cambodia is influenced by activities far away and developments outside the fisheries sector. The challenge for local communities is to gain support in

decision-making institutions which can influence the fishery. This means institutions that can communicate across national boundaries and penetrate divides between administrations in different sectors. In recent years, with a growing number of driving forces for change, this has become particularly important.

A series of events has recently influenced the patterns of aquatic resource use in the Siphandone area. Change is being driven by infrastructure, particularly Road 13 between Pakse and the Cambodian border completed in 2000, as well as improved fish storage, better transport facilities and larger, more effective types of fishing gear. As a result, villagers have better access to urban markets and local practices have

altered, notably with household choices of fishing gear which has increased pressure on the resource. "Fishing pressure has increased - not necessarily because there are more fishermen but because fishermen use more and better fishing gear," one fisherman from Khong Island said.

Whereas fishing used to be primarily for subsistence, people are now increasingly fishing to generate incomes. Some commercially-driven activities are problematic. These activities are not only perceived by local fishers as posing a great ecological threat but also seen as distorting the "shared and equal benefit" system traditionally associated with the Mekong fisheries. The blocking of entire streams, hindering the yearly migrations of fish, is perceived as especially harmful. The use of large-mesh gill nets up to 200 m long, primarily by wealthier households, is considered less damaging. But their use minimises the chances of those with smaller nets catching what they see as their share of the fish.

Today, the catch from the Siphandone fishery is traded over vast distances, reaching the Evening and Dao Huang markets in Pakse, the Thongkhankhan market in Vientiane and even markets in Thailand. Similarly, fish caught in Cambodia are traded across the border and sold to Lao and Thai markets. Lao traders invest in coolers for Cambodian middlemen, allowing them to transport fresh fish over long distances. The migration of living fish combined with the trade of caught fish adds to the geographical scale and trans-boundary nature of this fishery.

With mobile phones becoming accessible to many traders, prices now react quickly to demand. According to one local government official, some species are overfished as a result of a harmful "feedback" mechanism affecting the prices of certain fish, often large species. As prices rise when a species becomes scarce, fishers put more effort into catching it to boost their incomes. From a management perspective, it is important to be aware of such mechanisms but they may be difficult to address.

Among Lao and Cambodian fishers, there is a general perception that practices in the two countries somewhat hinder the yearly upstream and downstream migrations of commercially-important species. Due to the geographical scale of fish migrations and the identified threats to the Siphandone fishery, local managers are seeking improved trans-boundary management. Co-management between government authorities as well as representatives from local fishing communities -

from both countries - is arguably the management set up required.

In interviews with Lao and Cambodian fishers along shared stretches of the Mekong, it is clear that they agree to certain rules that are often similar. Some, such as those on illegal fishing, are government regulations in both countries. Others are more informal, such as the exact allocation of access to fishing grounds along shared stretches of the river.

So far, agreements between the Lao and Cambodian fisheries departments have been formulated as of memoranda of understanding. But coordinated management action by both countries is still lacking. On the side of governments, the Technical Advisory Body for Fisheries Management (TAB) - a regional network of fisheries agencies in the lower basin supported by the MRC - has shown particular interest in this trans-boundary fishery and could play an important role in the future. On the users' side there are organisations in fisheries where both Lao and Cambodian fishers are represented. However, trans-boundary communications between local authorities and users on both sides of the border can be improved, as was recently shown by the Mekong Wetlands Biodiversity Conservation Programme on the conservation of Irrawaddy dolphins.

Dealing with the threats to the Siphandone fishery requires interventions at geographical scales that are both local and beyond the local level. This is only possible through institutions operating at administrative levels which bridge local with "supra-local" interests and users with government - in other words, co-management. Similarly, the case in Siphandone shows that managers must be aware of developments in other sectors which may have impacts on the fisheries, even though such developments may be difficult to influence.

The needs and prospects for coordinated transboundary management by fisher communities and authorities in Champassak, Lao PDR and Stung Treng, Cambodia were the object of one of five case studies on issues of scale in fisheries management undertaken by the MRC Fisheries Programme and the Institute for Fisheries Management and Coastal Community Development, Denmark with funding from the Challenge Programme for Water and Food. Further cases highlighted issues such as management funding, up-scaling of co-management from local to national levels and others. Their results will be presented in coming issues of *Catch & Culture*.

Deputy provincial governors take steps to tackle mutual problems

By Sourasay Phoumavong



The signing ceremony held at Stung Treng, Cambodia. Photo provided by Sourasay Phoumavong, Lao National Mekong Committee

Illegal fishing with poisons and explosives, fishing in spawning areas and the lack of a closed season common to both Lao and Cambodian fishermen are just some of the problems along the border. A dolphin pool area, a major tourist attraction, suffers its own problems with noise pollution, solid waste and sewerage. Fishing in the pool area is another cause for concern

Managing trans-boundary fisheries is not the only challenge facing government authorities and Mekong River fishing communities along the Lao-Cambodian border. In addition to problems with

fishing, the area around the Lao border checkpoint at Veunkham and Anlong Chhouteal in Cambodia has problems with tourism, a dolphin pool and waste. These problems are cause for concern and are now being addressed following a meeting on trans-boundary wetland management in Pakse in March.

At the meeting, deputy governors from the two provinces on each side of the border agreed that fishing involving poisons, explosives and other illegal methods was a problem, especially in the dry season. Fishing in the dolphin pool - believed to be the northernmost Mekong River habitat of the threatened Irrawaddy dolphin (*Orcaella brevirostris*) - is also problematic. So too is fishing in spawning areas in three wetland sites located in both

countries. Two of the Lao sites in Muang Khong and Mou Laparnok districts of Champassak Province have been proposed as internationally-important wetlands under the Ramsar Convention, a global agreement dating back to 1971. The third site in Thala Borivath district in Stung Treng province in Cambodia is already a Ramsar site. The two sides agreed that another problem for fisheries management was the lack of a closed fishing season common to both Lao and Cambodian fishermen.

To tackle these problems, the deputy governors acknowledged the need for short-term solutions as well as ways to address fisheries management in the longer term. As a first step, they recommended that technical fisheries staff hold meetings to work out actions to take to curb illegal fishing methods and find appropriate ways to reduce unsustainable fishing practices in the area. They also agreed that more research was needed before for developing action plans to protect spawning areas.

To address problems with tourism and the dolphin pool, the two sides agreed on the need for management solutions and regulations. The area around Veunkham and Anlong Chhousteal, for example, lacks a tourism management plan. Other problems include navigation - especially of fast and noisy speedboats - and the inefficient management of fees charged to visitors. As for the dolphin pool, the impact of nylon gillnets, poisons and explosives is a problem. So too is the lack of clear demarcation of the pool area and awareness of demarcation. Another problem is caused by navigation across the

pool which has resulted in accidents and noise pollution.

To tackle these problems, the deputy governors recommended that provincial tourism officials meet with tour operators to start developing a management plan. They agreed that the plan needed to address the issue of navigation across the dolphin pool.

The deputy governors also highlighted the need to address waste management given the problem caused by solid waste and sewerage around the dolphin pool. The area around Veunkham and Anlong Chhousteal currently lacks a waste-management plan. The two sides recommended that district and municipal agencies in charge of waste management meet with tourism officials and operators to make sure the problem is addressed in their tourism management plan.

The concerns and recommendations to improve transboundary wetland management were recorded in minutes that were signed by the deputy provincial governors of Champassak and Stung Treng on July 12. The Lao and Cambodian National Mekong Committees witnessed the signing of this important document, which is aimed at improving trans-boundary wetland management for people on both sides of the border.

** Mr. Sourasay is Deputy Director-General of the Lao National Mekong Committee and also a member of the MRC's Technical Advisory Body for Fisheries Management.*



Cambodia's national fish day



Hundreds and thousands of fish and other aquatic animals were released during the ceremony throughout Cambodia. *Photo: Joe Garrison*

National Fish Day just gets bigger

Cambodia's National Fish Day became truly national this year with several cabinet ministers joining Prime Minister Hun Sen at the main ceremony and related activities in rivers, lakes and other water bodies in dozens of communes across the country. Now in its fourth year, the July event marks the beginning of the three-month closed season for large and medium-scale fishing. To raise awareness of fisheries and encourage more people to take part, events were organised at the commune level as well this year.

At the main event at Oknha Heng reservoir in Prey Nup district in Sihanoukville on July 1, Hun Sen urged Cambodians to refrain from fishing during the closed

season and from using illegal fishing gear. He also appealed to people to stop clearing flooded-forest and mangrove areas while calling for efforts to prevent the farming of predatory species.

Hun Sen noted that while Cambodia's fishery resources were a crucial source of protein and provided jobs for about two million people, rural poverty had helped deplete natural resources and destroy the environment over the years.

"The most imminent challenge is that our network for broadcasting information is insufficient and our use of technology is still very limited," he said. The prime minister also bemoaned the lack of public awareness of the importance of natural resources, the



The giant carp, *Catlocarpio siamensis*, is Cambodia's national fish. Photo: Zeb Hogan.

environment and sustainable development in Cambodia. To address these issues, Mr Hun Sen said the government was determined to hand over powers to rural communities.

The Prime Minister vowed to continue the government's rigorous crackdown on electro-fishing gear and illegal fine-mesh nets, notably those used to catch juveniles at the beginning of the wet season in June and July. He also acknowledged that the "anarchic" destruction of flooded forest was a "burning issue" that authorities needed to address.

"All of these offences are acts that root out fishery resources. We need to create more conservation stations and protected areas to increase natural stocks by focusing on providing rights and power to rural communities, enabling farmers to actively participate and be responsible for national resources on their own."

Mr Hun Sen also highlighted agriculture's contribution to the country's double-digit growth of more than 13 percent last year, which made Cambodia the fastest-

growing economy in the Mekong basin. In a separate speech, Agriculture, Forestry and Fisheries Minister Chan Sarun said total fish production was estimated at 380,000 tonnes last year, with fish and seaweed farming reaching a record 37,675 tonnes.

The Prime Minister joined the agriculture, education, telecommunications and tourism ministers in releasing some of the 50,000 fish and other aquatic animals prepared for the ceremony. Cambodian People's Party Secretary-General Say Chhum also attended the event, along with Deputy Prime Minister Nhiek Bun Chhay, who is secretary-general of the junior party in Cambodia's coalition government.

Hundreds of thousands of additional fish were released in separate events across the country throughout July, with Fisheries Department Director Nao Thuok and Deputy Director Sam Nouv presiding over several ceremonies in Angkor Borei district in Takeo province near the border with Viet Nam. National Assembly Vice President Nguon Nhel presided over a separate event in his constituency in Kompong Thom province.

Lao success breeds confidence in culture from wild brood stock

By Somboon



Pangasius conchophilus and *Hemibagrus wyckioides* - see box on page 18 for the local names).



Researchers strip a *Cirrhinus microlepis* as part of the breeding programme. Photo: Somboon

The Khone Falls near the Lao-Cambodian border area has plenty of mature female fishes in the wild. Under a new programme, Lao researchers are breeding and nursing two indigenous species. They plan to breed a third and hope to boost survival rates over the coming year, researching more species if possible

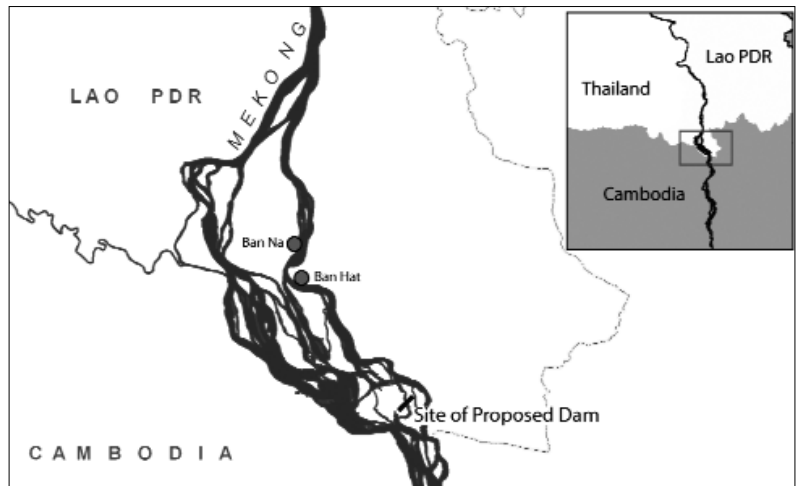
Over the past five years, the Living Aquatic Resource Research Centre (LARReC) in Vientiane has been researching the propagation of indigenous Mekong species. The centre has succeeded in breeding and nursing seven species - five cyprinids, one species of catfish and a gourami - in Vientiane as well as Champassak and Luang Prabang provinces. Research into other cyprinid and catfish species is still going on (*Cirrhinus microlepis*, *Pangasius krempfi*,

The research has been carried out under MRC cooperation with support from Danida, the Danish aid agency. Since May 2005, the French Agricultural Research Centre for International Development (CIRAD) has provided additional support for a three-year research project in Muang Khong district in Champassak province. Work to domesticate several species involves both developing aquaculture and conserving fish diversity. Activities are part of the Aquaculture of Indigenous Mekong Species (AIMS) component of the MRC Fisheries Programme.

Several fast-growing omnivorous species of high market value have good potential for aquaculture. Research is focusing on the rare Asian red-tail catfish (*Hemibagrus wyckioides*) called pa kheung in Lao, the small-scale river carp (*Cirrhinus microlepis*) known as pa phon and Krempf's catfish (*Pangasius krempfi*) or pa suey hang leuang. Research is also being done on a more common shark catfish species (*Pangasianodon hypophthalmus*) known as pa suey or pa suey kheo (and tra in Viet Nam where it is widely raised in ponds, cages and net pens).

Activities are based at a LARReC-managed station in Muang Khong district, located in the Siphandone (4,000-island) area near the Khone Falls near the Cambodian border. Apart from its role as a popular tourist spot, this area has an abundance of species and is also an important spawning ground for wild fish migrating upstream from Cambodia and Viet Nam. With relatively easy access to mature females in the wild, researchers produced tens of thousands of larvae this year from red-tail catfish and small-scale river carp caught during the breeding season. The larvae are nursed in tanks at Ban Hat station and then transferred to ponds at Ban Na station on Khong Island.

The project has transferred 30 female red tails to the Km 8 station in Pakse to establish brood stock, a relatively cheap way to get seed while making sustainable use of large breeders from rare species. The Asian red-tail catfish is from the bagrid family that includes the very common yellow catfish (*Hemibagrus filamentus*, formerly *Mystus nemurus*), one of the three species from the earlier project still being researched. Found in upland rivers, red tail catfish can grow to 130 centimetres and weigh up to 80 kilograms. On average, a female weighing 4.7 kilograms can produce 45,300 eggs. By comparison, a female small-scale river carp of 3.4 kilograms can produce 165,000.



Successful breeding and nursing of these species is already taking place and the project has started working with Krempf's catfish as well. After an initial trial in 2004, research on this species was scheduled to resume with upstream migrations during this year's monsoon season. Some fingerlings stocked in local fisheries stations will be reared and further domesticated in earthen ponds.

The centre's research into these valuable fast-growing species is being carried out by a team of technical

staff working with CIRAD expert Philippe Cacot. It is hoped that more species will be recruited in the research, although this depends on financial support. In the meantime, the project aims to improve facilities and provide staff training to get better survival rates.

* Mr. Somboon is Deputy Chief of the Aquaculture Unit of the Living Aquatic Resources Research Centre in Vientiane.

Initial successes with breeding

- Cirrhinus microlepis*
(small-scale river carp, *pa phon*)
- Barbonymus microlepis*
(tin foil barb, *pa pak*)
- Clarias macrocephalus*
(broadhead catfish, *pa duk ui*)
- Osphronemus exodon*
(elephant ear gourami, *pa men*)
- Labeo chrysophekadion*
(black shark minnow, *pa phia*)
- Puntioplites falcifer*
(silver barb, *pa sakang*)
- Cirrhinus molitorella*
(mud carp, *pa keng*)

Research still underway

- Hemibagrus filamentus* (formerly *Mystus nemurus*)
(yellow catfish, *pa ko*)
- Henicorhynchus siamensis*
(Siamese mud carp, *pa soi*)
- Pangasianodon hypophthalmus*
(Sutchi catfish, *pa suey* or *pa suey kheo*)

Current focus of research

- Hemibagrus wyckioides*
(Asian red-tail catfish, *pa kheung*)
- Cirrhinus microlepis*
(small-scale river carp, *pa phon*)
- Pangasius krempfi*
(Krempf's catfish, *pa suay hang leuang*)
- Pangasianodon hypophthalmus*
(Sutchi catfish, *pa suey* or *pa suey kheo*)

Focus: distribution and ecology of the small-scale river carp, *Cirrhinus microlepis*

Before it matures and spawns, this omnivorous species of carp migrates between feeding and refuge habitats over several seasons. As it swims upstream in the dry season from January to March, it emerges as one of the most important species for local fisheries. The species is also important for the dai fishery on the Tonle Sap between December and February



Scientific name: *Cirrhinus microlepis*
 Family: *Cyprinidae* (minnows and carps)
 Khmer: *trey pruol, troy kralang*
 Lao: *pa phon, pa phon mak kok*
 Thai: *pla nuan chan, pla pon*
 Vietnamese: *ca duong*
 Size: up to 65 cm

Distribution

Mekong (throughout lower basin) and Thailand's Chao Phraya system.

Population

At least two populations occur in the Mekong. One stretches from Bolikhamxay province near Vientiane down to the delta in Viet Nam (Figure 1). Another has been recorded from the area around the Loei River, upstream from Vientiane, to as far north as the port of Chiang Saen near the Thai-Lao border with Myanmar. The populations may overlap.

Critical habitats

As of 2004, research had identified one spawning

habitat in the Lao village of Phatomphone about 50 km south of Pakse. This wide stretch of the river near the Lao-Cambodian border has sandy bottoms and shallow beaches alternating with rapids. For many years, the site has supplied broodstock for an artificial breeding programme. Feeding habitats for larvae and juveniles are in the floodplains, particularly in the Tonle Sap and the delta in Viet Nam, and include flooded forest areas where young fish feed on leaves. Dry-season refuge habitats are found in deep pools along the Mekong mainstream north of Kratie.

Life cycle

After spawning in June and July, eggs and larvae drift downstream to nursery habitats in the extensive flood plains of the Mekong River. Juveniles and adults also move downstream during the flood season, especially to flood plains in southern Cambodia and Viet Nam, and up into the Tonle Sap as the river reverses its flow every year.

As the floodwaters recede with the onset of the dry season in October and November, the young start moving out of the flood plains. Once back in the Mekong, they start migrating upstream in large numbers to seek refuge in dry-season habitats in deep pools. When the next flood season arrives, the younger fish return to the flood plains to feed as the mature adults head for their spawning grounds. The species is sexually mature at 17 cm and a female of two to three kilogrammes can produce between 130,000 and 275,000 eggs.

Migration patterns are less clear for the population further north. In Ubon Ratchathani province in Thailand, research shows that the species migrates upstream from Khong Chiam district in February and from Khemarat district in March or April. At Mukdahan, it starts migrating upstream in May. But in June and July, it migrates back downstream to Khong Chiam, some in a reproductive condition.

Upstream from Vientiane, the species is found all year around near the Loei River in Thailand. Between the Lao province of Xayaboury and the Chiang Saen district of Thailand, younger fish of 15

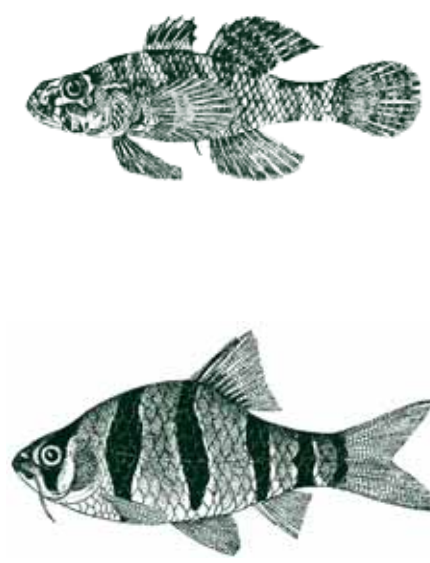
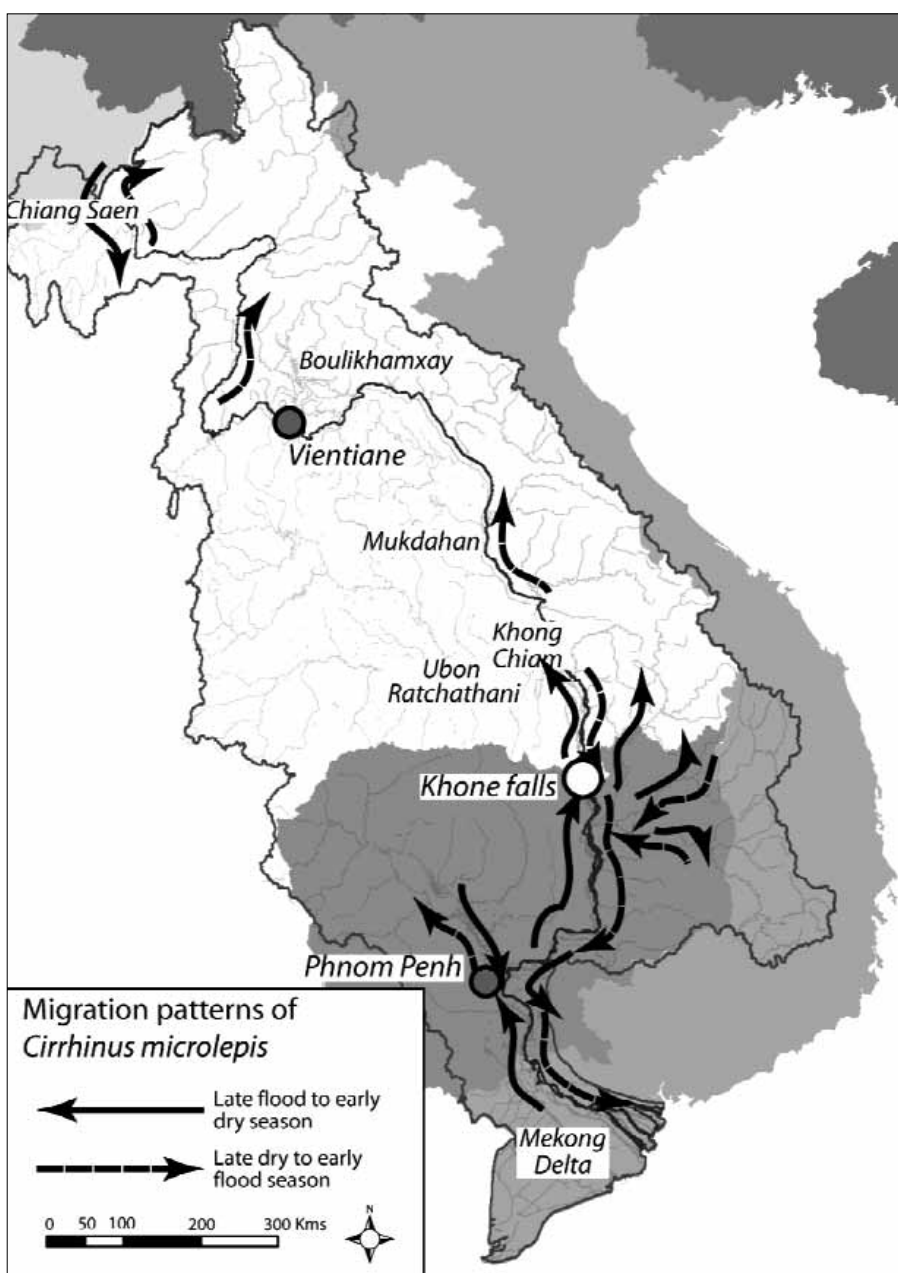
to 50 cm migrate upstream in March and April. In June and July, a second upward migration takes place involving larger fish of 40 to 90 cm including mature fish with eggs.

Fisheries

Juveniles are mainly caught in local fisheries during upstream migrations from January to March and in Cambodia's fixed bagnet dai fishery on the Tonle Sap river during downstream migrations from the

lake from December to February. Large adults are sometimes caught in the middle stretches of the Mekong.

Source: *Distribution and Ecology of Some Important Riverine Fish Species of the Mekong River Basin, MRC Technical Paper No. 10*

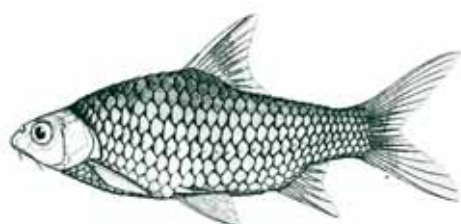


Built structures and their impacts on fisheries - a research project in Cambodia

Research aims to identify pros and cons of infrastructure development

A new research project under the Cambodian National Mekong Committee (CNMC) has selected three sites to assess how structures built around the Tonle Sap Lake are affecting local fisheries. The study is scheduled to be completed early next year with guidelines aimed at maximising returns from built structures and minimising any adverse impacts they might have on the environment or communities living around the lake. The World Fish Center is carrying out the project which is financed by an Asian Development Bank (ADB) technical assistance grant of \$765,000 funded by Finland. Key partners include the Inland Fisheries Research and Development Institute of the Cambodian Department of Fisheries and a team of Finnish scientists at the MRC's Water Utilisation Programme.

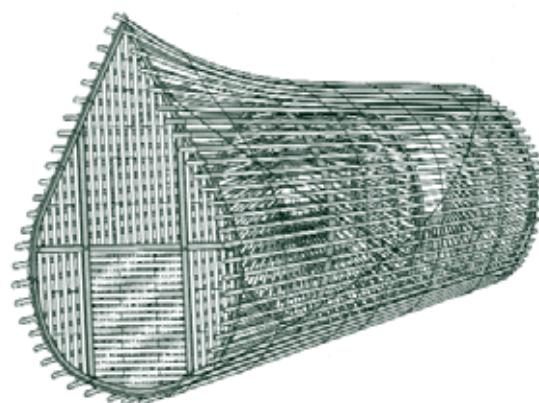
Speaking at a workshop in Phnom Penh in July, CNMC Vice Chairman Mr Sin Niny noted that the high productivity of the Tonle Sap could be adversely affected by population growth, over-exploitation of natural resources and development schemes. "Structural development projects within the Tonle Sap basin require proper and detailed studies on ecological and socio-economic conditions," he said. "Sustainable development and management of natural resources, specifically fisheries and biodiversity of the Tonle Sap lake, require a clear legal framework and collective efforts and utmost cooperation and involvement of all parties concerned."



Yumiko Kura, programme coordinator at the World Fish Center's Greater Mekong Regional Office in Phnom Penh, highlighted the need to understand the various trade offs involved in making development decisions. "Understanding positive and negative effects of infrastructure development projects is a key to balancing economic growth and protection of the Tonle Sap," she told the same workshop.

The project has six components including creating a database of major man-made structures and modelling their impact on both the flow and quality of the water. The study will also assess how major structures influence fish and the livelihoods of people around the lake. To convey the research findings and recommendations to decision makers and other stakeholders, a policy brief and a set of guidelines will be developed early next year.

The database is expected to comprise structures such as dams, weirs, irrigation schemes, levees and embankments that oppose outflows of water. It also expected to include structures that prevent inflows of water like roads, railways, flood-control works, polders, dykes and wharves. Fishing gear that can alter water flows or obstruct fish migration will also be included.



Garry Bernacsek



***Dr Garry Bernacsek
- Coordinator of the
Fisheries Ecology,
Valuation and
Mitigation
component of the
MRC Fisheries
Program - died on
1 July 2006, aged 56.***

When Garry Bernacsek ventured to Africa in the late seventies, he was setting out on the second stage of a life journey that would span five continents, dozens of countries and several war zones. Born into the post-war rubble of Austria in 1950, he emigrated to Canada as a young boy and developed an early interest in fisheries while majoring in zoology at McGill University in Montreal. Returning to Europe, he attended the University of Bristol where he completed his PhD in ichthyology (vertebrate palaeontology). Back in Quebec, Dr. Bernacsek worked for the Pulp and Paper Research Institute of Canada where he studied the effects of pulp-mill effluent on aquatic organisms and did fish-toxicity testing for the private sector.

In 1979, Dr. Bernacsek moved to Tanzania where he lectured at the Zoology Department of the University of Dar es Salaam. It was during this period that he started working for the United Nations Food and Agriculture Organisation (FAO) and began studying the impacts of dams on fisheries. He wrote a booklet on Tanzania's freshwater fishes and developed a model for assessing catches of estuarine species before moving to Mozambique where he worked for the local fisheries ministry. Over the next few years, he worked in both western and eastern Africa as well as Ethiopia, Madagascar and Zambia with brief stints in Pakistan and the Philippines, mainly with the FAO but also for the Canadian aid agency and the World Conservation Union (IUCN). Subsequent work took him to Bangladesh, Eritrea and even Iraq where he did a study on the southern marshlands, a globally-important wetlands destroyed under Saddam Hussein. In between, he managed to expand his academic horizons by studying economics back in Montreal.

As the Mekong River Commission was being set up in 1995, Dr. Bernacsek was reviewing the Lao

government's environmental policies and assessing the impact of its economic policies on agriculture, forestry and fisheries. He was soon carrying out research in all four countries of the Lower Mekong Basin, developing an MRC database on reservoir fisheries. In a separate project for the MRC, he studied the impacts of irrigation dams, weirs, pumping and wells on inland fisheries in the lower basin. After more work in Bangladesh, Mauritius and Mozambique, Dr. Bernacsek prepared a strategic environmental framework for the Greater Mekong Subregion (GMS) programme of the Asian Development Bank (ADB) which covered the MRC 's four members as well as dialogue partners China and Myanmar. During this period, he also worked on flood control and catfish culture in the Mekong Delta and wrote a report for the World Commission on Dams on managing fish diversity, stocks and species threatened during the six main phases of dam development. He then worked on a series of fisheries and conservation projects in Bangladesh, China and Sri Lanka before returning to Viet Nam for the second phase of the flood-control project in the delta.

Over the past four years, Dr. Bernacsek mainly worked with the FAO and ADB around the Tonle Sap in Cambodia. Projects included drafting a general fisheries plan for the Great Lake, improving the Chong Kneas landing facility in Siem Reap and developing fisheries management and cage culture. Ahead of last year's approval of the Nam Theun 2 Hydroelectric Project in Lao PDR (see *Catch and Culture*, Vol. 11, No 1) he carried out a fish migration study, reviewing migratory behavior and patterns of fish species



downstream from both the dam site and the power station. He identified the project's potential impact on migrations and assessed the subsequent impact on fisheries in the Nam Theun and Xe Bang Fai rivers and the new Nakai reservoir. He also reviewed the aquatic ecology and life history of fish species, proposed mitigation measures and assessed the fisheries potential of the new reservoir.

Dr. Bernacsek was not only a fisheries and environmental scientist but also an accomplished guitarist with other interests ranging from economics to engineering and archaeology. He set up his own company in Australia, where he learnt video production and scuba diving, and had recently bought a house in an historic Italian town near Siena. A prolific writer, he authored more than a hundred reports, guidebooks and technical papers, notably the three-volume Sourcebook for the Inland Fisheries Resources of Africa and Dam Design and Operation to Optimize Fish Production in Impounded River Basins, both published by the FAO. He also published the book Blue Motion: The World Directory of Video and CD-ROM on Fisheries and Aquatic Environments listing hundreds of titles from more than 70 countries. Before joining the MRC in May, he was researching the historical ecology of the Tonle Sap and trying to reconstruct the fisheries sector of ancient Angkor. One of his lasting legacies to the Mekong region may

well be his recent design for a vertical-slot fish pass as part of the ADB-funded rehabilitation of the Stung Chinit irrigation scheme in Cambodia. Working with the MRC and the Cambodian Department of Fisheries, Dr. Bernacsek started a programme to monitor the structure's impact on fisheries in the river which flows into the Tonle Sap. He also assessed the potential for fisheries and aquaculture development in the area, preparing a management and development plan that included community fisheries in the Stung Chinit Reservoir as well as fish sanctuaries along with cage, rice-fish and pond culture. The fish pass is only the second of its type in Asia and based on his earlier design for a similar structure in northeast Bangladesh in the late nineties. Dr. Bernacsek made a video about the fish pass in Bangladesh and completed a plan for fisheries and aquaculture at Stung Chinit for the Cambodian Ministry of Water Resources and Meteorology in February this year. As his medical condition deteriorated in Bangkok in late June following complications from hepatitis A, the fish pass in Cambodia was poised to become fully operational.

Garry was cremated in Bangkok shortly after his death. He will finally be laid to rest in the Memorial Gardens cemetery in Breslau, Ontario, Canada on 10 September 2006.

Former colleagues remember...

Tomi Petr, formerly Senior Fishery Resources Officer, Fisheries Department, FAO:

"I have known Garry for about 30 years if not longer, since the time he worked in Tanzania. We kept in touch throughout the years. He was a very conscientious scientist, hard working, meticulous, sometimes difficult to please. He was a person of many good ideas, and always worked hard to implement them. This included his hobbies. He was interested in old cars, and I will never forget when he took me on a ride in his newly acquired and rather old BMW 720i on Cristoforo Colombo, a major road in a busy part of Rome bypassing the old FAO building. Between two traffic lights we reached 130 km/h. His passing is a major loss for tropical fisheries."

Robin Welcomme, Senior Research Advisor, Imperial College, London:

"I have known and worked with Gary from the very earliest days in FAO. He was a dedicated scientist

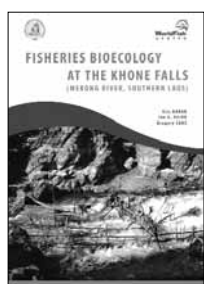
and a superb synthesiser, making available a wide range of information to other scientists and administrators working in the field of tropical fisheries. He was also a great guy to travel with. He is a great loss to inland fisheries science."

Olivier Serrat, Senior Project Economist, Asian Development Bank:

"From early days, Garry was associated with the Tonle Sap Initiative, a partnership of organizations and people working to meet the poverty and environment challenges of the Tonle Sap in Cambodia. He drafted the first-ever fisheries management plan for the Tonle Sap and conceptualised the fish pass at Stung Chinit. He lent a hand at Chong Kneas (a proposed port development on the Great Lake) and strove to identify pathways for sustainable livelihoods there and elsewhere. In these and other endeavours, the mark that characterised his work was high and flawless productivity."

New Information Products

Fisheries Bioecology at the Khone Falls (Mekong River, Southern Laos)



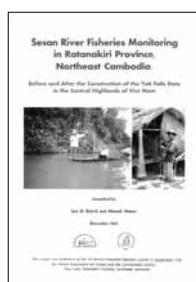
The Khone Falls in southern Laos is a series of rapids and waterfalls on the mainstream of the Mekong, which form a barrier below which fish congregate prior to moving through the falls at certain times of the year. Fishers in the region have devised several remarkable fishing techniques to account for the geography of the area and

behaviour of the many species they target. Khone Falls fisheries were monitored from 1993 to 1999 and a recent publication provides a unique insight into these fisheries. The study details fishing patterns in the area, seasonal abundance of fishes, relationship between catches and river flow, timing and triggers of migrations, and the role of deep pools in the dry season. The authors have presented their analyses in an easy-to-read publication, with attractive graphics and illustrations.

Soft cover, 80 pages, in English.

Available from WorldFish Center in Phnom Penh (US\$6.00 per copy plus postage). Downloadable from www.worldfishcenter.org (scientific publications page) and from www.gapeinternational.org

Sesan River fisheries monitoring in Ratanakiri province, northeast Cambodia: Before and after the construction of the Yali Falls dam in the Central Highlands of Viet Nam.



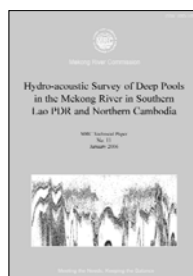
This report presents the quantitative and qualitative results of a study conducted in Ratanakiri province regarding fisheries in the Sesan River. The study includes two main components. The first involved collecting quantitative catch-and-

effort fisheries data, in order to assess the present state of fisheries in the Sesan River in Ratanakiri province. The second component involved using local ecological knowledge about the past and present to assess the downstream impacts of the Yali Falls dam on fish and fisheries in Ratanakiri. Recommendations to improve the integrated management of the river's ecosystem are discussed.

Soft cover, 92 pages, in English with Khmer summary.

Available as hard or electronic copies from the 3S Rivers Protection Network, email sesan@camintel.com Downloadable from <http://www.rwesa.org/>

Hydro-acoustic surveys of deep pools in the Mekong River in Southern Lao PDR and Northern Cambodia



This paper documents the results of a hydro-acoustic survey over 30 deep pools in the stretch of the Mekong from Siphandone, in southern Lao PDR, to Stung Treng, in Northern Cambodia. The survey, which was the first of its type in the Mekong River system, provides fish biologists with unique two-dimensional images of the river's

cross-section. These show fish and shoals of fish in open water and also congregating near topographic features in the riverbed, such as steep slopes and crevices. Biomass and fish-density data, extracted from the hydro-acoustic records, reveal preferences for certain depth strata in the pools and bring to light interesting variations in the distribution of size, classes of fish and fish density during the wet and dry seasons.

MRC Technical Paper No. 11, August 2006.
US\$5.00 plus postage (also available as a free download on www.mrcmekong.org).

TAB Management Recommendation No 4 - Gender and Fisheries in the Lower Mekong Basin.



Women play an important role in the fisheries of the Lower Mekong Basin. In some areas, such as processing and marketing, they predominate over men. Despite this, the role of women in the sector often goes unrecognised and unappreciated. As result, the representation of women in fisheries management, and in

policy-making positions, does not match the contribution they make to the sector as a whole. This booklet reviews the various roles of women in the Mekong's fisheries from aquaculture through to government. It examines how the misconceptions of women's roles in fisheries developed and presents a series of recommendations that will raise the profile of women and help redress this imbalance.

TAB Management Recommendation No.5 - Livelihood Approaches and Fisheries Management in the Lower Mekong Basin.

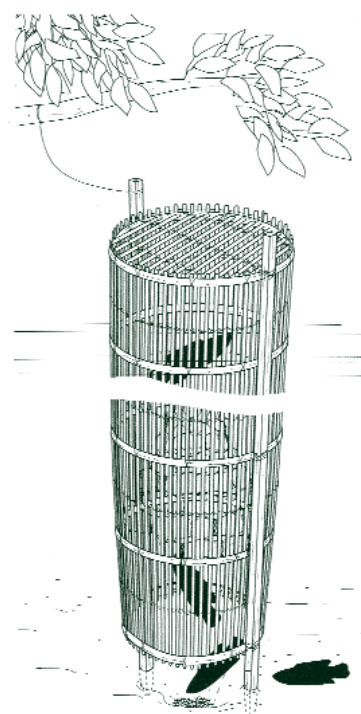
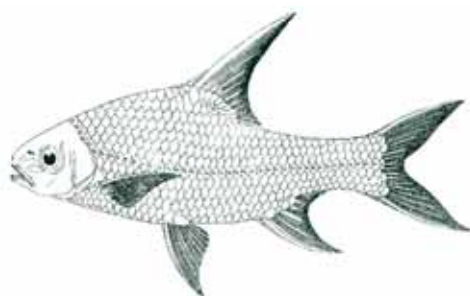
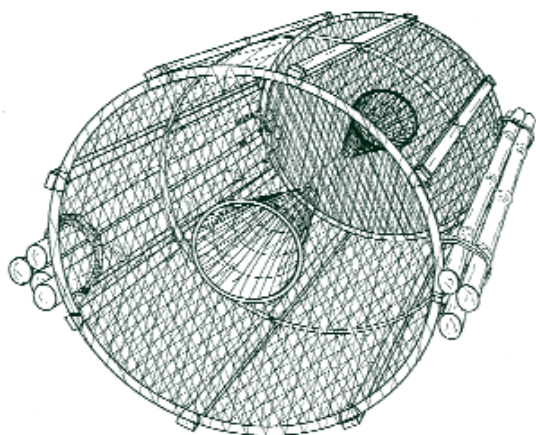


Nowadays fisheries management involves more than safeguarding, or increasing, fish production. Fisheries managers are now part of the drive to reduce poverty in rural communities in the Lower Mekong Basin. This means that managers must look at fishing and fisheries as part of a broader set of livelihoods based around a variety of natural

resources. 'Livelihood approaches' provide a way of examining the ways rural people make a living from a more complete, holistic, perspective.

This booklet provides a review of 'livelihood approaches', what they involve and how a variety of studies have used the approach to evaluate the way of life of communities across the basin. It presents a series of recommendations that will help fisheries managers and policy-makers understand the value of livelihood approaches and how the information they provide can be taken up in policies and procedures for fisheries management.

Both Management Recommendations are US\$3.00 plus postage (also available as free downloads on www.mrcmekong.org)



Mekong Fisheries Index

Champassak faces overfishing as local flout ban Vientiane Times, 1 May 2006

An influx of tourists and money into the Champassak region of Laos has led the owners of floating restaurants to worry that fish stocks are declining. One owner said he thought the decline in fish stocks was due to an increasing number of people living on the riverbanks and overfishing in the breeding season, when water is low and fish are easy to catch, despite the fact the Department Livestock and Fisheries has issued a ban on fishing during this time. Officials from the Khong district blame the use of fine nets for the depletion in fish stocks as they kill everything that gets snared in the mesh.

Fisheries Sector plans aquatic varieties Viet Nam News, 19 May 2006

The fisheries sector plans to invest around US\$ 57 million in a five year programme to 2010 to breed new varieties of seafood for aquacultural production, according to the Ministry of Fisheries. The programme's 84 projects include building and upgrading breeding centres involved in developing both salt water and freshwater products such as lobster, tilapia and various molluscs. Other priorities for the fisheries industry are technological solutions in breeding disease-resistant shrimp suitable for large scale cultivation. The Ministry said the fisheries sector would see many new opportunities and challenges when Viet Nam joined the World Trade Organisation.

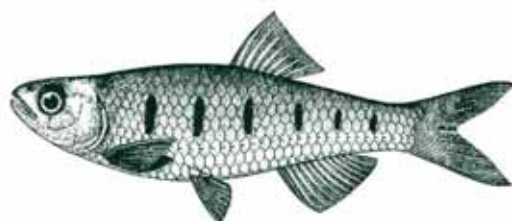
Delta fisheries plan sustainable development Viet Nam News Service, 15 May 2006

Aquaculture development in the Mekong River delta should go hand-in-hand with improving irrigation, environmental protection, and promoting markets to ensure sustainable growth, the fisheries minister Ta Quang Ngoc said, adding that the Government had approved a plan to expand area under aquaculture by 120,000 hectares to 1.1 million ha in 2010. Aquaculture output was then expected to increase by 600,000 tonnes to 2.08 million tonnes, and export revenues from US\$2.8 billion this year to \$3.6 billion. This year the Ministry of Agriculture and Rural Development would develop four irrigation projects to provide water for 6,400 ha of fish and shrimp farms in Thai Binh, Hai Phong, Ninh Binh, and Soc Trang provinces. Head of the fisheries ministry's hygiene control department, Nguyen Tu Cuong, said that from next year the Food and Agriculture Organisation and the Network of Aquaculture Centres in Asia-Pacific would help the delta region preserve its marine resources and promote production of safe and clean products to ensure economic efficiency.

June on the Mekong

Viet Nam News Service, 4 June 2006

June and July in the Cuu Long (Mekong) Delta is the season of floods, which brings a lot of freshwater fish to the river. Residents of Chau Doc (An Giang) and Hong Ngu (Dong Thap) catch the fish from the wild, which are much more appreciated than the ones

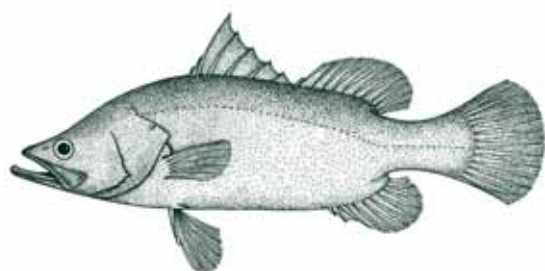


hatched artificially because they are healthier and grow rapidly. Floods also bring in lots of basa and tra catfish but fishermen appreciate them less than the small fish they call linh. Basa and tra have been raised artificially in great numbers, while linh can only be found in the wild, and it is impossible to raise them artificially in floating cages. A decade ago, linh were abundant when June arrived. Local people still remember the floods of 1978 when there were so many of them that the Mekong River turned a silver colour. Oversupply allowed people to use their fat for light instead of kerosene and as manure for tobacco fields on the banks of the Mekong River. Today, with intensive fishing and environmental changes, the linh is becoming rare, and the amount fished in June has led it to be known as a delicacy. As the fish cannot survive after it is pulled out of water, it cannot be given to hotels and restaurants. Tourists who want to savour the delicate flavour of linh must accompany local fishermen for a fresh catch. - VNS

Giant catfish win reprieve in honor of Thai king

The Star Online, Malaysia. 9 June, 2006

Thai fishermen have agreed to stop netting the critically endangered Mekong giant catfish in honor of their king's 60th anniversary. In a ceremony honoring King Bhumibol Adulyadej nearly 60 fishermen in the northern Thai city of Chiang Khong are expected to commit to a voluntary ban on catching Southeast Asia's largest and rarest fish - and will be given 20,000 baht (US\$520; euro410) for each giant catfish net they surrender. "This is a great commitment from fishermen. Every fisherman will stop fishing giant catfish forever," said Tuenjai Deetes, senator for Chiang Rai province, near the Lao border. Conservationists have hailed the voluntary ban as a first step toward saving the giant catfish from extinction. "It's a significant example of an agreement between fishermen, scientists and conservation organisations and politicians," said Peter John Meynell of the Mekong Wetland Biodiversity Programme. "By having this moratorium, you are taking the pressure off this fish. You are allowing them to go and spawn." Officials are hoping to work out a



similar agreement with Lao fishermen and to further compensate the former fishermen by providing them with alternative means of income including by promoting tourism in the area.

Fertility clinic on the Mekong

The Nation, 16 July 2006

A team of scientists has turned to biotechnology to save the fast-disappearing Mekong giant catfish - the world's largest freshwater fish. Thanks to advances in genetics, researchers now can ensure the diversity of the species by crossbreeding some of the 20 pairs of cultivated specimens in the hands of the Fisheries Department. "This could be done based on our two-year-old research into the DNA of the species, covering a total of 129 artificially bred fish and 16 wild ones," Uthairat Na Nakhon, the team leader from Kasetsart University said. "This means we can ensure that the species will be far from extinct. In case all the wild fish in the Mekong River are gone, we'll still have the bred ones in reserve," she said. Scientists know precious little about the fish, except that it is mild-mannered and easily spooked. The catfish migrate upstream and there at least 10 places where they can be sighted, including China's Dali passage and Cambodia's Tonle Sap, Southeast Asia's largest freshwater lake. Chiang Rai is the only big fishing spot. In 1980, the Fisheries Department succeeded in artificially breeding the species, and in 2001 researchers ensured that artificially bred catfish could produce offspring without any dependence on eggs and sperm from wild ones. Uthairat's work is regarded as the third stage of success, as researchers now can conserve most of the species' genetic diversity. "

Catfish named Basa for Australian Market

Viet Nam News 12 August 2006-08-25

Vietnamese catfish must now bear the name Basa for the Australian market, according to the Australian Fish Names committee. "Using other trade names for imported catfish would violate the naming regulations on imported goods to Australia," said the Australian Seafood Importers Association.



VN to produce bio-fuel from tra fish fat

VietNamNet, 16 August 2006

Saigon Petrol and An Giang Fisheries Import - Export Company (Agifish) have signed a memorandum on setting up a joint venture to produce bio-fuel from tra and basa fat. Nguyen Dinh Huan, Deputy Director General of Agifish said that a plant will be set up in the southern province of An Giang with projected capacity of 10,000 tonnes/year. All the equipment needed to run the plant will be imported. Saigon Petro and Agifish still must negotiate partners for the joint venture, the capital contribution ratio and the location for the plant. Chairman of the An Giang People's Committee Lam Minh Chieu said that the project is feasible on paper, and should kick start a lot of similar projects between companies in HCM City and An Giang Province. He has committed to creating favourable conditions for the project in the fourth quarter of the year. Every year the Mekong River Delta provinces consume 400,000 tonnes of basa and tra. The main material supply for the bio-fuel plant will be the 60,000 tonnes of fish fat that can be provided from fish farms in the area. Agifish has announced it has been producing bio-fuel from tra and basa fish which it claims is more efficient than diesel. The product made by Agifish is believed to be non-toxic, and generates far less exhaust. Saigon Petro is a HCM City-based company, specialising in producing and trading oil and gas products. Agifish has been well known as one of the biggest seafood processors in Viet Nam.

Japan a key buyer of domestic seafood

Viet Nam news, 22 August 2006

Japan has become the major buyer of Viet Nam's seafood as processors switch from the problematic US market. Fisheries Ministry figures show the change with exports to Japan accounting for 23 per cent of the total for the first six months of the year. Exports to the European Union totalled 23.2 per cent and to the US 18 per cent. Russia had become a major buyer of basa and tra, at 15.6 per cent of the total. We plan to maintain major traditional markets

while marketing and expanding into new places like China and non-European countries said the ministry spokesman.

Snake harvest threatens Cambodian lake

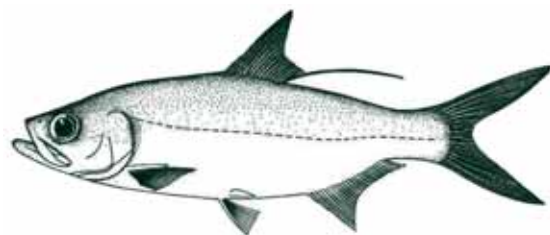
Associated Press, 19 August, 2006

Cambodia has the world's largest snake harvest. The snakes are often fed to crocodiles on farms. "They prefer snakes over fish. They have red blood and good protein," says Sen Rith, owner of one of Cambodia's 900 or so crocodile farms, which are growing increasingly dependent on snakes as stocks of fish are depleted in the Tonle Sap's once bountiful waters. Researchers for the Wildlife Conservation Society estimate nearly 4 million snakes are plucked out each year, and fear that number can't sustain the snake population. That raises concerns among both the thousands who make their living off the catch and environmentalists monitoring the fragile and already battered lake. "The snakes have got to be rated as forming one of the most important components of the ecology of the Tonle Sap," says Joe Walston, who heads the New York-based society's operation in Cambodia. "They are an important predator, but also an important food source for large raptors, wild crocs (and other animals). If they were to decline the effects would be devastating on some of the world's most important colonies of water birds and other wildlife." Local fishers say there are far fewer snakes these days, and they worry both about future catches and possible government controls on the harvest.

Strategy approval sets agenda for Mekong River Commission's future work in Basin

MRC Press release, 29th August 2006

Considering and endorsing the final draft of the Mekong River Commission's Strategic Plan 2006-2010 would set the path for the MRC's work for the next five years. H. E. Mr Sin Niny, Vice Chairman of the Cambodia National Mekong Committee and Chairman of the Mekong River Commission (MRC) Joint Committee for 2006/2007 told participants in the 24th meeting of the MRC Joint Committee in



Vientiane. Mr Sin Niny explained that the meeting would be making a number of important decisions on basin planning as well as discussions on the future directions of the Water Utilisation Programme (WUP). One of the most important activities in the current meeting would be the endorsement of the final draft of the MRC Strategic Plan 2006-2010, according to Dr Olivier Cogels Chief Executive Officer of the MRC Secretariat. Dr Cogels said the plan had undergone extensive consultations with member countries, donors and stakeholders and MRC was now ready to move into action to undertake the work programme underlined in this strategy. "We now have a very good consensus to support our work over the next five years. Now we have to get to work on implementing our integrated programme in order to bring benefits the people of the Mekong Basin," Dr Cogels said. "This important strategy both supports the Mekong Programme and forms the structural basis for very efficient integrated development of the basin and its water and related resources in order to fulfil the activities outlined in the 1995 Mekong Agreement." Representatives from MRC Dialogue Partner country Myanmar, the Asian Development Bank (ADB), Association of South East Asian Nations (ASEAN), World Conservation Union (IUCN), United Nations Development Programme (UNDP), the Worldwide Fund for Nature (WWF) and the World Bank attended the meeting.

New freshwater threadfin

Practical Fishkeeping Magazine, 1 September 2006

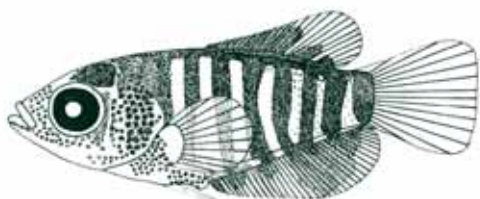
A new species of freshwater threadfin from the *Polynemus* genus has been discovered in the Mekong River in Vietnam. The new species was collected in the Cho Gao canal, in the Mekong River basin in My Tho Province in Vietnam and has just been named *Polynemus bidentatus* by Hiroyuki Motomura of the Kagoshima University Museum and Shinji Tsukawaki of Kanazawa University in the latest issue of the Journal the Raffles Bulletin of Zoology. Somewhat

unusually, the species was described from just a single specimen collected by the Mekong research team in an otter trawl of the Cho Gao canal in 1974 and has remained in the spirit collection at the University of Michigan's Museum of Zoology. During a recent study, the scientists found that the specimen had a different shape to its tooth patches than other *Polynemus*, lacked a swimbladder and had various other morphomeric features suggesting it was an undescribed fish. Motomura and Tsukawaki said: "The new species can be distinguished from all other species of *Polynemus* by having vomerine teeth separate at the midline, forming two toothed patches (vs. single toothed patch). Motomura and Tsukawaki say that although most members of the polynemid family are marine, all members of the *Polynemus* genus (including the new species) are freshwater fish, apart from *Polynemus paradiseus*, which only enters freshwater during the spawning season. The species are notoriously difficult to identify accurately.

Mekong Delta breeds Ho fish

Viet Nam News, 2 September 2006

Scientists at the HCM City-based Research Institute for Aquaculture No 2 have successfully raised the rare Ho fish (giant barb) in an effort to bring the nearly extinct Mekong River species back to prominence, said local authorities. Pham Van Khanh, Director of the institute's Centre for Southern Fresh Water species in the Mekong Delta's Cai Be District, Tien Giang Province, is in charge of the project reproducing and raising Ho fish in the region back to healthy numbers. The fish also known as *Catlocarpio siamensis*, is of the fresh water carp family and has been listed in Viet Nam's Red Book as a rare and endangered species. Before the project began in 2003, Khanh and his team spent several years working with the Mekong River Commission to research the freshwater fish. They found that the Ho fish was as rare as they feared and decided to take on the project in an effort to boost the fish

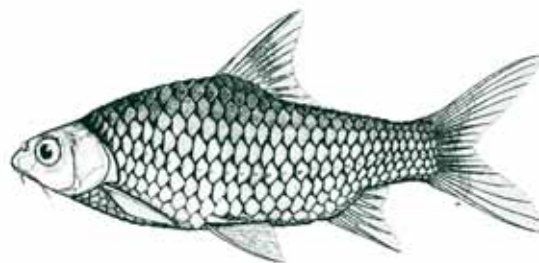
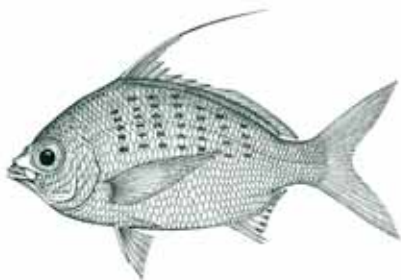


population's numbers. Khanh and his team began raising Ho fish on a trial basis in 2003. The project originally used a breeding method normally used for other carp families whereby the Ho fish was given a gonadotrophic shot inducing much quicker egg-laying than in the wild. However, they found that the rate of fry (baby fish) that survived the artificial method was low due to poor quality water environment, unsuitable fish fodder and inexperienced fish breeders. In 2006, the team corrected their problems by selecting only the healthiest largest parent fish and placing them into their own cleaner ponds with better fodder and more adept breeders. After five months, the breeding was producing successful numbers. They now estimate the centre will be able to produce 400,000 fish through this method in 2006. As part of the programme, Khanh said that the centre is preparing to supply 10,000 Ho fish fingerlings to an aquatic farming company in HCM City.

40 per cent of fish comes from aquaculture

The Nation, 5 September 2006

More than 40 per cent of fish consumed as food worldwide is raised on farms rather than caught in the wild, a five-fold increase in 26 years, the Food and Agriculture Organisation (FAO) has reported. "While in 1980 just nine per cent of the fish consumed by humans came from aquaculture, today 43 per cent does," the FAO said in a statement, citing the report "The State of World Aquaculture 2006", released yesterday. A total of 45.5 million tonnes of farmed fish – worth US\$63 billion – are eaten each year and demand is expected to continue climbing, especially in affluent nations, the report said. In 2004 developed countries imported 33 million tonnes of fish worth over US\$61 billion, accounting for more than 80 per cent of the value of all fish imports that year. But levels of captures of wild fish - estimated at 90 to 93 million tonnes annually - have remained roughly stable since the mid-1980s, the report said, adding that there was scant prospect of any increase in coming decades.



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Battambang

Closed-season ceremonies in other provinces



All around the country, those involved with the fisheries gathered to make their contribution to Cambodia's National Fish Day with fish releases, tree plantings and other celebrations.



Kompong Chhang



Angkor Borei



Angkor Borei



Sompov Meas



Siem Reap



Stung Chinit



Catch and Culture

Cambodia's National Fish Day

Raising people's awareness of fisheries



Despite the heavy rain, thousands of people from all walks of life came to the National Fish Day ceremony at Oknha Heng reservoir, near Sihanoukville. Now in its fourth year, this ceremony has become a truly national event with celebrations going on around the country in different provinces and hundreds of thousands of fish and other aquatic animals being released.



Highlighting threats to a rich natural resource



Prime Minister Hun Sen offered prayers to venerable monks before addressing the crowd. He urged the nation to conserve its fisheries and not to use destructive fishing practices and emphasised the need to increase the power of local communities.



Releasing fish and other aquatic animals



The Prime Minister joined several cabinet ministers in releasing the fish and other aquatic animals prepared for the ceremony. He vowed to continue the crackdown on those who catch juvenile fish in the wet season.

