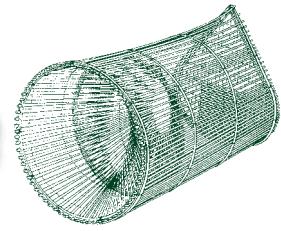


# Catch and Culture



## Fisheries Research and Development in the Mekong Region

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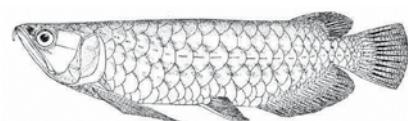
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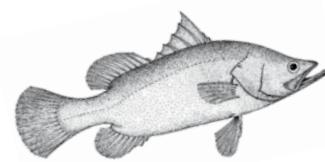
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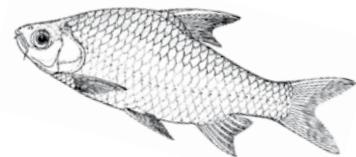
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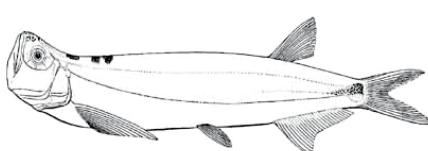
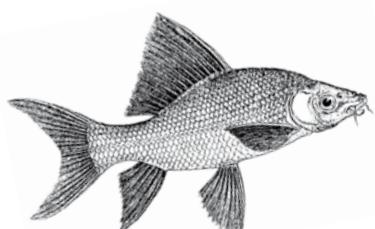
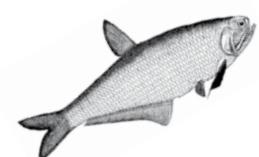
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# Efforts towards managing cave prawn stocks in northern Lao PDR

By ALOUN KOUNTHONGBANG, KOJI OMORI, PANY SOULIYAMATH, OULAYTHAM LASASSIMA AND SAYAKA ITO \*

## Prohibiting catches at the peak of the breeding season helps dwindling prawn stocks to recover

Khung bo (*Macrobrachium yui*) is an indigenous freshwater prawn found in northern Lao PDR where it is an important source of cash income for people living in river basins. People use bamboo traps to catch the prawns as they migrate to cave streams (see *Catch and Culture*, Vol 17, No 2). However, stocks have been depleted in most prawning grounds due to factors such as over-exploitation and deterioration of the aquatic environment from human impacts. In Na Pho village in the northern Lao province of Luang

Prabang, for example, prawn catches are about half of what they were several years ago. Reduced stocks have severely eroded the incomes of local households which rely on prawns as a major means of livelihood.

To bring about a recovery and sustain the availability of stocks, a research project on stock management began in Na Pho village in 2007. At the beginning of the project, there was little biological information about the prawn. We studied its biological characteristics using ecological and molecular genetic approaches. As a result, we were able to verify the life cycle of the prawn (see opposite). We especially focussed on two

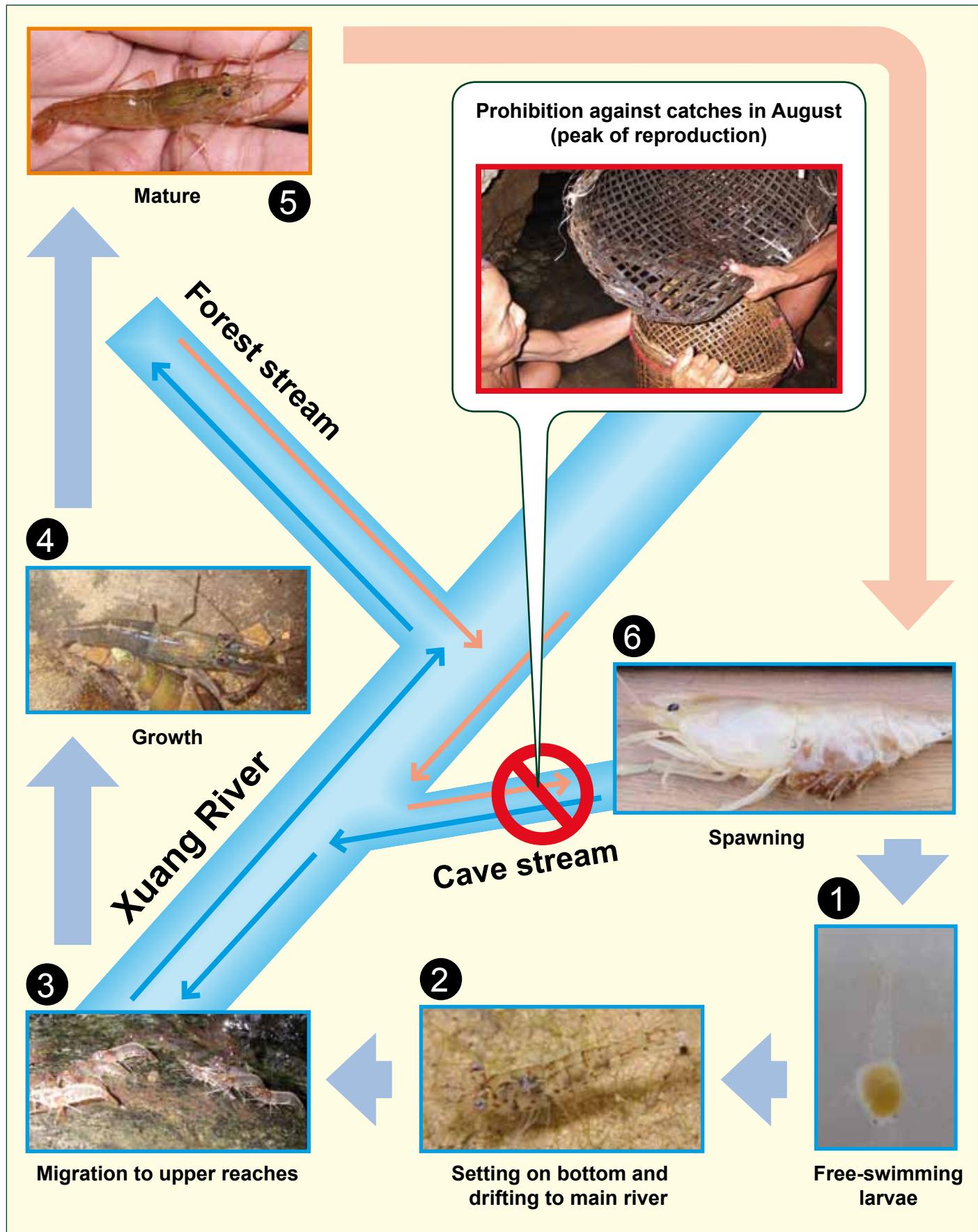


Prawn trader with village customer

PHOTO: S. Ito

**Life cycle of *Macrobrachium yui***

Xuang River in northern Lao province of Luang Prabang



biological characteristics — the prawns reproduce only in cave streams within the river system where they are born and the breeding season peaks in August.

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**'Prohibiting catches in cave streams at the peak of breeding season was considered the centerpiece of regulation'**

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Prohibiting catches in cave streams at the peak of breeding season was considered the centerpiece of regulation. To evaluate the effects of the regulation, models were created using biological factors such as female fecundity, seasonal change in the number of brooding females and growth patterns. The modelling predicted that prohibitions would lead to an increase in the relative catch. Based on Article 53 of the fishery regulations of the Lao Ministry of Agriculture and Forestry and at the initiative of villagers and the local government, the prohibition against catching the prawns in

August went into effect in 2011.

With enforcement of the regulation, larval prawns emerged as usual in October and peaked in November. Remarkably, the number of larval prawns were maintained at high levels equivalent to about three times the average (see opposite). Since the number of adults migrating into the cave streams was normal, we judged that the increase in the number of larval prawns was probably due

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**'The increase in the number of larval prawns was probably due to the prohibition. This encouraged the villagers to continue to comply with the regulation'**

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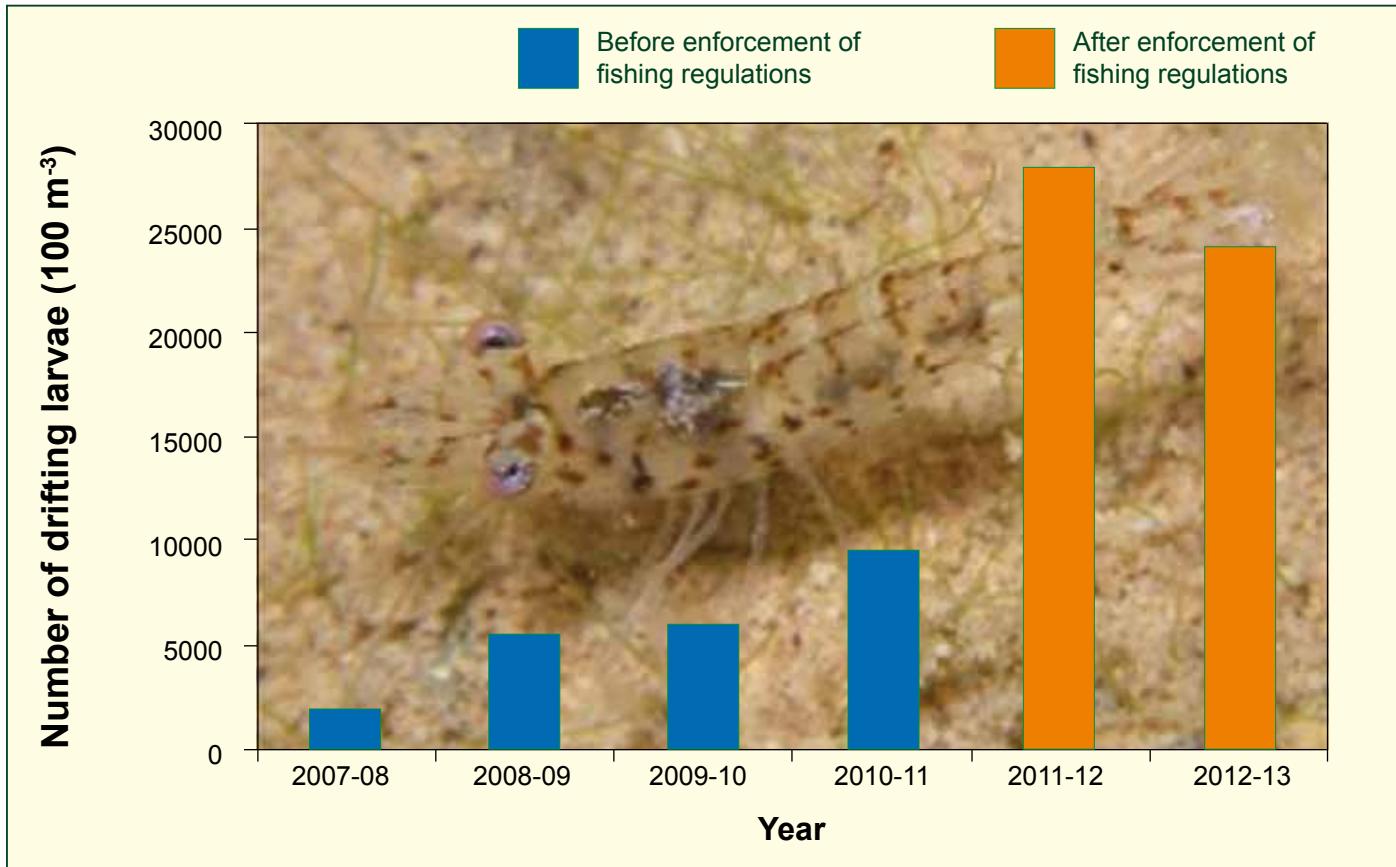
to the prohibition. This encouraged the villagers to continue to comply with the regulation for the recovery of stocks and their sustainable use.



Workshop on prohibiting prawn catches in August. The ban came into force in 2011.

PHOTO: S. Ito

## Larval drift before and after prohibition



Violations of the rules have not yet been reported, indicating high awareness among villagers.

**'We expect that the higher number of larval prawns will increase the number of mature prawns after two to three years'**

At present, we are continuing long-term monitoring of stock dynamics. We expect that the higher number of larval prawns will increase the number of mature prawns after two to three years. In addition, we are studying factors to conserve the habitat of the prawn. These research activities are supported by the Toyota Foundation and the Japan International Research Centre for Agricultural Sciences (JIRCAS).

In the future, we will promote the establishment of a fishermen's union and a stock-monitoring system to enable villagers to manage the stocks by themselves. The union could also control distribution of benefits to the villagers in accordance with social circumstances. The village

community system is essential for managing stocks and sustaining their use and has been important in achieving the recovery.

### Least Concern

According to the IUCN Red List of Threatened Species, *Macrobrachium yui* is known from river systems in Yunnan in China as well as northern provinces Viet Nam, Thailand and Lao PDR. It is also likely to be more widely distributed in China itself. "In view of this wide distribution, as well as the absence of any, known, major threats, the species is considered as of Least Concern," it says in its latest assessment published earlier this year.

\* Mr Aloun is a researcher at the Living Aquatic Resources Research Centre (LARReC) in Vientiane, Dr Omori is an associate professor at the Centre for Marine Environmental Studies at Ehime University in Japan, Mr Pany is chief of the Na Luang Fisheries Station of the Provincial Agriculture and Forestry Office in Luang Prabang, Mr Oulaytham is a researcher at LARReC and Dr Ito is a senior researcher with the Japan International Research Center for Agricultural Sciences (JIRCAS)

# Interspecific hybrid catfish in Thailand

By UTHAIRAT NA-NAKORN \*

**Hybridization of the native broad-head catfish with the African sharp-tooth catfish has made a significant contribution to walking catfish farming in Thailand. But adopting such technology needs to be accompanied by an awareness of the adverse impacts on native species and the environment with guidelines for aquaculture to be ecologically sustainable.**

Interspecific hybridization is an approach to producing living organisms that rarely exist in nature. The general objective is to combine desirable traits from maternal and paternal species, to make use of hybrid vigour or heterosis (a phenomenon where the hybrid performs better than the average of the parental species).

Interspecific hybridization occurs more easily in fish than other vertebrates, probably because of the flexible sex-determining system of fish, which enables the better survival of the hybrids. Although interspecific hybridization has been done in laboratories, very few hybrids have been used at a commercial scale. However the hybrid between the broad-head catfish, *Clarias macrocephalus* and male African sharp-tooth catfish, *Clarias gariepinus* is a good example of a commercially successful hybrid.

## Reasons for hybridization

The broad-head catfish is native to Southeast Asia. It is found in shallow freshwater throughout the region. It is a favourite food fish in Thailand and the neighbouring countries because of its desirable yellowish colour and the texture of its flesh, and it thus commands a relatively high market price. However, the culture of this species was not successful on a commercial scale due to its slow growth that required at least seven months reaching a marketable size of 200 grams. Moreover, it is very susceptible to bacterial diseases that reduced the survival rate to about 30 percent. These were the main reasons for hybridizing the broad-head catfish with the African sharp-tooth catfish, *C. gariepinus* which was introduced from Viet Nam via Lao PDR in 1987 (FishBase, 2007).

The African sharp-tooth catfish is native to Africa. It was introduced to Southeast Asia because of its high growth rate (reaching 200 grams body weight within 3 months) and low mortality due to diseases (survival rate about 80-95 percent). However, its meat quality (white and soft meat) was not well accepted by local people. Therefore, it was hybridized with some local catfish species in the hope of producing fast-growing, disease-resistant hybrids with acceptable meat quality.



African catfish (*Clarias gariepinus*)

SOURCE: ILLUSTRATIONS OF THE ZOOLOGY OF SOUTH AFRICA

## Establishment of technology

There has been no record of the first hybridization attempt between these two species. Anecdotal reports state it was first done by a local farmer in northeastern Thailand by trial and error. The technology has been rapidly transferred among catfish hatcheries because the protocols were similar to the well-known breeding practice of the broad-head catfish. In brief, the hybridization is done by artificial insemination where a mature female broad-head catfish is injected once with a hormone (LH-RH analogue, Trade name: Suprefact) at 25 µg/kg plus Domperidone at 5 mg/kg while the male African sharp-tooth catfish is injected with the same hormone at 10 µg/kg and the same dosage of Domperidone. About 15 hours after injection the females are made to release their eggs by the breeder gently pressing on the belly. The eggs come out easily through the urogenital opening. Then the eggs are mixed with sperm solution squeezed from the minced testes of the sacrificed male. The sticky fertilized eggs are simply spread on the fine mesh net immersed under water. Hatching occurs 24–36 hours after fertilization. The fry are then fed with live food (water fleas) and will reach fingerling size of 1 inch within 10 days. The hybrid is very similar to the broad-head catfish and is always misidentified by local people as this species.

Nukwan *et al.* (1990) were the first group to perform scientific investigations on this hybridization. They found that only the hybrid having the broad-head catfish as the mother hatched and survived well; the hybrid did not show heterosis for growth (i.e. the growth rate of the hybrid was not higher than average growth rate of the parents). The advantages of the hybrid over the maternal species (the broad-head catfish) was the improved growth rate (reaching 200 grams body weight within 4 months) and survival rate, while the meat quality was better accepted than that of the paternal species (the African catfish).

## Contributions of the hybrid catfish

The hybrid has been widely accepted by the farmers and as such, it enhanced the country's annual production of walking catfish (mixed species of the genus *Clarias* are often generally referred to as walking catfish) from 17 900 metric tonnes in 1990 to the peak of 159 314 metric

## Adverse impacts of the hybrid catfish

A dark side of the practice of hybridization also exists. Despite the fact that a majority of the interspecific hybrid animals are sterile, the female hybrid catfish produces mature eggs although in numbers far lower than the parental species; the males show a higher degree of sterility. As such, there was a concern that if the hybrid escaped into natural water bodies, it might backcross with the native catfish species including the broad-head catfish. The repeated back-crossing could eventually result in genetic introgression which may compromise the fitness of the local species.

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### 'The escaped hybrid may be contributing to the decline of native walking catfish by reducing their fitness'

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During the past decades, Thailand has frequently faced severe floods, which resulted in the escape of millions of the hybrids into natural water bodies. The adverse impact of the escapees was revealed by the detection of gene-products in the wild broad-head catfish collected from habitats in every part of the country (Senanan *et al.*, 2004; Na-Nakorn *et al.*, 2004) that were found previously only in the African sharp-tooth catfish. This supports the hypothesis that the escaped hybrid may be contributing to the decline of native walking catfish by reducing their fitness. However, other factors such as habitat loss and overharvesting would also contribute to the decline of the native catfish. So far, there are no measures to mitigate the problem of genetic introgression, while the escape of the hybrid from grow-out farms still occasionally occurs.

tonnes in 2004 despite a slight decline during the recent years (Figure 1).

The beneficiaries of this technology are the catfish hatcheries and the grow-out farmers. The catfish hatcheries that practise the hybridization technology are located mainly in central Thailand where the water flea *Moina macrocopa*, an essential food for the fry, is commercially available.

### **Native species is 'near threatened'**

The International Union for the Conservation of Nature (IUCN) considers the broad-head catfish (*Clarias macrocephalus*) to be a "near threatened" species. According to the website of the IUCN Red List of Threatened Species, the fish is native to Cambodia, Lao PDR and Thailand and Viet Nam as well as Peninsular Malaysia.

"Across much of its range the extent and quality of this species' habitat has declined, and it is inferred that the population numbers have also declined as a result of this," it says. Referring to research by Dr Uthairat published in 2004, "the species is also threatened by aquaculture and (through hybridization and competition) by escaped hybrids" across the northern parts of its range.

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**'If data were available on the rate of population decline, it is likely that this species may even reach the thresholds for a threatened category'**

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"The species is assessed as Near Threatened at present due to the scale of decline in suitable habitat, the impacts of introduced species and the extensive population decline. If data were available on the rate of population decline, it is likely that this species may even reach the thresholds for a threatened category."

The IUCN notes that the species lives in lowland wetlands and rivers, including sluggish flowing canals and flooded fields. It occurs in shallow, open water and is capable of lying buried in mud for lengthy periods if water evaporates during dry seasons. The fish is dependent on swamps and swamp forests, and can move out of the water using its extended fins. It feeds on aquatic insects, young shrimps and small fishes.

Although the exact number is not known, the number of hatcheries is estimated to be at least 1,000 throughout the country. The number of

grow-out farms is much higher. In 2010, there were 79,288 catfish farms in Thailand covering an area of 14,432 hectares (Research and Statistical Analysis Division, 2010). At present, among freshwater commodities in Thailand, hybrid catfish production is second only to Nile tilapia, and Thailand has been ranked first among the walking catfish producing countries (FAO, 2010). This has made this technology a successful case study of the application of biotechnology to aquaculture.

The culture of the hybrid has been practised at either commercial or backyard scale. The commercial farms stocked the hybrid in earthen ponds of varying sizes (large ponds of more than one hectare in the central provinces and small ponds in northeastern provinces). The stocking density of the 2-cm long fingerlings is very high (about 1,000,000 fingerlings per hectare). The culture period is about 4-5 months and the yield is about 70,000 kg/hectare in the central provinces, slightly lower in the northeastern provinces.

The survival rate ranges from 40 to 60 percent. Feeding differs according to parts of the country. For example, the farms in central Thailand have access to cheap, high nutritional value wastes (e.g. chicken viscera, waste from fish processing plants), thus they rely on these wastes. The additional reason is the low market price of the hybrid catfish in central Thailand (USD 0.8/kg) that forces the farmers to reduce the cost. In northeastern provinces where the hybrid demands higher market price (e.g. USD 1/kg), farmers use commercially available pellet feed only.

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**'The backyard culture of the hybrid catfish is practised in rural areas and the production does not significantly contribute to the country's production. However, it does provide poor people with a cheap protein source and small income'**

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The backyard culture of the hybrid catfish is practised in rural areas and the production does not significantly contribute to the country's production. However, it does provide poor people with a cheap protein source and small income from limited resources available. The fingerlings (mostly of large size about two inches) are stocked in small ponds (100-200 square metres), tanks

or cages, at relatively low stocking density. They are fed mainly with commercially available pellets while locally available protein sources (e.g. silk worm pupae, termites) are occasionally used as feed whenever available. The culture period is about three months when the 100-gram fish are harvested. At present, backyard culture is being promoted throughout the country as a part of a drive for self-sufficiency in agriculture.

### Current production trend

As previously mentioned, the country's annual production of walking catfish has declined slightly. The major obstacle is the reduction of its market price. Since the export market of catfish is very limited, a majority of the hybrid catfish production is consumed domestically.

As such, the market is easily oversupplied, which affects the market price. In addition, deteriorating pond environments are triggering disease outbreaks with increasing frequency. These are the major causes of the recent reduction in annual production. Overall, the hybridization technology has made a highly significant contribution to the aquaculture production of walking catfish

in Thailand. The technology has triggered enormous expansion of the aquaculture business of walking catfish, feed industries and other related businesses. Moreover, it enhances the access of poor rural people to cheap and high-quality protein from the hybrid. Nevertheless, the farming of hybrids also has an adverse impact on native species and the environment. The adoption of this technology in the future should therefore be accompanied by an awareness of the adverse impacts. Good guidelines for the breeding of the hybrid should be established and endorsed for the sake of the ecological sustainability of aquaculture.

### Further reading:

Vidthayanon, C. & Allen, D. 2011. *Clarias macrocephalus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.1.

\* Dr Uthairat is Director of the Research Development Institute of Kasetsart University in Bangkok. This article appeared in Biotechnologies at Work for Smallholders: Case Studies from Developing Countries in Crops, Livestock and Fish published in October by the Food and Agricultural Organisation as part of its occasional papers series on innovation in family farming.



Broad-head catfish (*Clarias macrocephalus*)

PHOTO: NAGAO NATURAL ENVIRONMENT FOUNDATION

# Researchers recommend greater use of guppies to control spread of dengue

**Report by ADB and WHO recommends scaling up low-cost intervention with exotic fish species in Cambodia and Lao PDR**

A joint report by the Asian Development Bank and the World Health Organisation is recommending greater use of guppies (*Poecilia reticulata*) in Cambodia and Lao PDR to control larvae and pupae of *Aedes aegypti*, the mosquito that spreads the dengue virus. The recommendation follows research projects in the two countries to determine whether households will accept using the colorful exotic fish in water storage jars, cement tanks and drums, including those containing drinking water. The projects also sought to determine the feasibility of distribution programmes for guppies, which feed on mosquito larvae, and whether households could be motivated — through community action or school programs — to eliminate smaller mosquito-breeding sites on their properties.

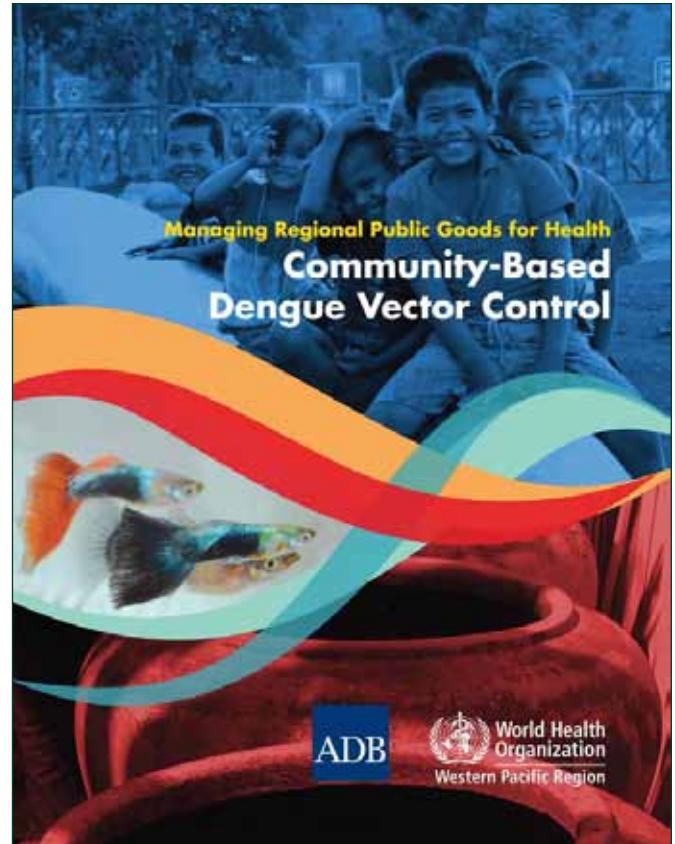
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**'Large water jars and cement tanks accounted for about 80 percent of the containers found with the *Aedes aegypti* mosquito'**

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Funded by the ADB, the projects were overseen by the WHO and implemented between 2009 and 2011 by HLSP, a health consultancy which is part of London-based Mott MacDonald Group Ltd. The Cambodian intervention sites were villages in the Tong Rong and Prey Krabau health centre catchment areas in Kampong Cham province, which has a high number of dengue cases. Comparison sites were other villages in the province covered by the Khor health centre. The Lao intervention sites were ten villages in Songkhone district in Savannakhet province, which has had major outbreaks of dengue. The comparison sites were eight villages in Xaypouthong district in the same province.

The joint report, published in September, noted



Report published in September

that large water jars and cement tanks accounted for about 80 percent of the containers found with the *Aedes aegypti* mosquito in Cambodia and Lao PDR (the species is historically considered as the primary vector of dengue and other viral diseases such as chikungunya and yellow fever). The research projects focused on these two types of containers as well as water drums. In the Cambodian research area, almost 40 percent of these three water containers had the mosquito larvae. By the end of the project, the proportion had dropped to less than three percent, the report said, adding that "similar" results were obtained in the Lao villages.

## Feasible, acceptable and safe

"The project results indicate that the pilot interventions were effective and successful in mobilising communities to establish and to

## Established in all or part of the basin

While guppies are "particularly successful" biological control agents, the ADB-WTO report recommends native rather than exotic larvivorous fish to control dengue given that introduced species may escape and threaten indigenous fauna. In the Lower Mekong Region, however, guppies have already escaped and become established in the wild in small streams and ditches, on the margins of rice fields and other shallow, still water habitats, as documented in *MRC Technical Paper No 9* published in 2003.

According to Fishbase, the guppy was introduced from South America to Singapore in 1937 and from Singapore to Thailand in 1960. Fishbase says the fish is established in both countries and has "probably some" ecological effects in Singapore but that the species is not established in Lao PDR, to which the guppy was introduced from an unknown country.

The MRC paper said the South American native was among nine fish species that "now seem to have established breeding populations in all or part of the basin." The guppy and the mosquito fish (*Gambusia affinis*), a species native to Northern and Central America which is from the same family as the guppy, "are everywhere in shallow fringing areas and drainage ditches." The mosquito fish is also established in southern Viet Nam (see *Catch and Culture* Vol 19, No 1).



Broodstock of *Poecilia reticulata* stocked in a small floating cage to avoid cannibalism. The species is ovoviparous — producing young by means of eggs hatched within the body of the parent — and the fry fall through the net mesh in the rearing tank.

PHOTO: FAO

maintain the guppy fish intervention, and in obtaining high levels of community acceptance of the fish in drinking water containers. Scale-up of the low-cost intervention is recommended in both countries," the report said, noting that the use of guppies was a "promising" year-round vector control measure that was feasible, acceptable and safe. Moreover, once established, it has minimal recurring costs.

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**'The project has proven to be an effective and simple community-based method of controlling the primary vectors of dengue fever'**

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Kunio Senga, director general of the ADB's Southeast Asia Department, and Shin Young-soo, director of the WHO regional office for the Western Pacific, said the success of the study had already led to the wider Lao use of guppies mobilising local resources. "The project has proven to be an effective and simple community-based method of controlling the primary vectors of dengue fever," they wrote in the foreword to the report.

But did either of the two projects indicate lower incidence of dengue after placing guppies in the water containers? According to ADB health specialist Gerard Servais, measuring changes in incidence would require much larger sampling to see statistically significant changes as well as serological surveys since some people infected with dengue do not develop symptoms. "This was beyond the scope of the survey," he told *Catch and Culture*. Yet the dengue vector control study did show a "statistically significant" decrease in the number of mosquito larvae in the water containers. "Scientific literature suggests that a decrease in mosquito larvae is associated with a decrease in the number of dengue cases," Servais said. "Anecdotal data from Laos suggest that the districts where the guppy fishes were introduced did not record new cases of dengue this year despite the current dengue epidemic in the country."

## Lao epidemic

Indeed, WHO figures released in October showed that Lao PDR recorded almost 43,000 cases of dengue including 95 deaths in the first nine

months of 2013, up sharply from around 6,600 in the same period in 2012. In neighbouring countries, however, the number of cases had declined, notably in Cambodia which recorded almost 15,200 cases including 45 deaths during the nine-month period, down from more than 35,000 a year earlier. Viet Nam had almost 44,100 cases including 43 deaths, down from more than 57,000 cases in the corresponding period in 2012.

The joint ADB-WHO report noted that the number of dengue cases was increasing worldwide with about 50 million to 100 million cases a year, resulting in hundreds of thousands of hospitalisations and more than 20,000 deaths, mostly among children and young adults. In Viet Nam and Cambodia, the report noted the "significant" economic impact of dengue. In rural

Cambodia, the average total cost to families does not differ significantly between dengue (\$31) and other illnesses involving fever (\$27). But hospitalising a child with dengue is 50 percent more expensive than sending a child to hospital with other febrile illnesses. Moreover, the debts incurred by families are more than twice their average weekly spending on food.

### Other control agents

Apart from guppies, the report noted that other biological control agents used to control dengue were copepod crustaceans from the *Mesocyclops* genus, which also eat mosquito larvae, and bacteria known as *Bacillus thuringiensis israelensis* (Bti), which release a toxin that kills the larvae after being ingested. The crustaceans have been found to be effective in controlling *Aedes aegypti* in Viet Nam and can last up to six



*Aedes aegypti* adult

PHOTO: MUHAMMAD MAHDI KARIM



*Aedes aegypti* larva

PHOTO: ECNT

months. "But periodic checks are necessary as they need to be replaced each time the container is cleaned or refilled or if food is scarce," the report said. Periodic checks are also required for the bacteria which do not last long, especially if there is frequent water exchange. A study in Cambodia, for example, found the bacteria to be effective for 1-3 months in water that was not exchanged. Fishes used as biological control agents also require periodic checking but only to ensure that a minimum number are in place. And if there are no mosquito larvae to feed on, they can eat other organic material such as algae.

Non-biological measures to combat dengue include environmental controls such as destroying, turning over or removing items that can accumulate water, and mechanical controls such as removing gutters where water can stagnate. There are also chemical controls through the use of insecticides such as temephos which kill the mosquito larvae when added to water containers. However, frequent changes of water may cause temephos to lose its effectiveness, requiring visits by vector control staff every two rather than three months. In any case, the report found that such dengue-control programs were not only labour intensive but also "ineffective" over the longer term. "Communities are not active partners in the control actions but rather passive participants or recipients of the control efforts," it said.

By contrast, the authors of the ADB-WHO report found that projects undertaken with Cambodian and Lao partners had resulted in the "successful" establishment of guppy-breeding and distribution systems at the national, provincial and local levels in both countries. They also generated multi-sector collaboration between ministries, non-profit groups, schools and health centres. Moreover, the report said, 88 percent of the water containers in Cambodia and 76 percent of those in Lao PDR still had guppies when the study came to an end.



*Mesocyclops edax*

PHOTO: CENTER FOR FRESHWATER BIOLOGY, UNIVERSITY OF NEW HAMPSHIRE

# East Asia Summit calls for expanding cooperation in fisheries management

**Leaders acknowledge the importance of aquatic ecosystems for sustenance, well-being and livelihoods of millions of people in the region and the critical role of small-scale and women fishers in ensuring household food security**

Leaders attending this year's East Asia Summit have agreed to better integrate small-holder and women fishers into global supply chains and efforts to achieve food security while expanding regional cooperation in fisheries management. The steps are among 13 measures to increase the level of food security outlined in a declaration adopted by the summit in Brunei on October 10. The Declaration of the Eighth East Asia Summit on Food Security also called for the removal of

protectionist measures and restraint in introducing new measures that are either inconsistent with WTO agreements or may hinder food trade as well as the promotion of better trade facilitation. To explore ways to realise their undertakings, the leaders tasked ministers with holding informal consultations between different government sectors as well as private and public stakeholders.

The East Asia Summit groups all ten ASEAN leaders — including the prime ministers of Cambodia, Lao PDR, Thailand and Viet Nam — with the leaders of Australia, China, India, Japan, Korea, New Zealand, Russia and the United States, although US President Barack Obama and Russian President Vladimir Putin skipped this year's summit and were instead represented



From left, US Secretary of State John Kerry, New Zealand Prime Minister John Key, Philippine President Benigno Aquino, South Korea President Park Geun-hye, Singapore Prime Minister Lee Hsien Loong, Thai Prime Minister Yingluck Shinawatra, Vietnamese Prime Minister Nguyen Tan Dung, Chinese Premier Li Keqiang, Brunei Sultan Hassanal Bolkiah, Myanmar President Thein Sein, Australian Prime Minister Tony Abbott, Cambodian Prime Minister Hun Sen, Indian Prime Minister Manmohan Singh, Indonesian President Susilo Bambang Yudhoyono, Japanese Prime Minister Shinzo Abe, Lao Prime Minister Thongsing Thammavong, Malaysian Prime Minister Najib Razak and Russian Foreign Minister Sergei Lavrov

PHOTO: NURUL QAIDAH AHMAD/INFORMATION DEPARTMENT/PRIME MINISTER'S OFFICE, BRUNEI DARUSSALAM

by their foreign ministers. In calling for expanded fisheries management cooperation, the leaders welcomed the adoption of terms of reference for a new Study Group on Enhancing Food Security through Sustainable Fisheries Management and Marine Environment Conservation at a meeting of foreign ministers in Brunei in July (see box). A statement issued by Brunei's Sultan Hassanal Bolkiah, who chaired the summit as part of the country's chairmanship of ASEAN this year, said the East Asia leaders "looked forward" to the recommendations of the Study Group at the Ninth East Asia Summit to be hosted by incoming ASEAN chair Myanmar in 2014.

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**'Critical role of smallholder and women farmers and fishers in sustaining agricultural and fishery production and ensuring household food security'**

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#### **Aquatic systems underlie food security**

"Millions of people in the region rely on the resources and services provided by terrestrial, marine and freshwater aquatic ecosystems for their sustenance, livelihoods and well-being," the declaration said, noting that these ecosystems "underlie" food security. To maintain them, "biodiversity conservation and sustainable management are crucial." At the same time, the declaration recognised the "critical role of smallholder and women farmers and fishers in sustaining agricultural and fishery production and ensuring household food security."

In addition to better integrating smallholders and women and expanding fisheries management cooperation, the declaration called for increasing food security information, drawing on private sector and academic expertise, and encouraging private and public sector stakeholders to make agricultural and other relevant data open and accessible to the public.

It also called for integrating existing regional and global food-security frameworks to develop best practices on improving collective food security; encouraging inclusive consultations with all stakeholders to promote responsible agricultural investment that respects rights, livelihoods and

#### **Enhancing Food Security through Sustainable Fisheries Management and Marine Environment Conservation**

The new Study Group is an initiative of the Ministry of Foreign Affairs and Trade (MOFAT) and the Ministry of Industry and Primary Resources (MIPR) of Brunei, which succeeded Cambodia as chair of the East Asia Summit in 2013. In addition to overseeing agriculture, forestry and fisheries, MIPR coordinates biosecurity, biodiversity research and conservation activities in the sultanate including the Heart of Borneo Declaration signed by Brunei, Indonesia and Malaysia in 2007. With the approval of its terms of reference by foreign ministers of the 18 participating countries in July, the Study Group was formed in September. Its recommendations on sustainable fisheries management and conservation are expected to be submitted to the East Asia Summit to be chaired by Myanmar's President Thein Sein towards the end of 2014.

resources; and drawing on existing agricultural capacity-building initiatives regionally and sharing best practices to improve agricultural production and productivity as well as dietary diversity.

#### **Need to expand research**

Other measures to increase food security cooperation in East Asia are expanding marine and agricultural science-and-technology research, including biotechnology and development investment and cooperation to promote sustainable food production and food safety, with consideration for national poverty eradication and food security priorities; promoting cooperation, sustainable use, and management of water resources; identifying possible cooperation in forest conservation and management; encouraging the protection of natural eco-systems and the preservation of biodiversity and varieties of plant genetics and agricultural production systems; exploring ways to reduce regional food supply chain loss and demand side loss, including post-consumer food waste due to unsustainable consumption patterns, taking into account work done on regional connectivity; and encouraging



Cambodian Prime Minister Hun Sen

PHOTO: MOHAMMAD MAHDI MARSIDI/PRIME MINISTER'S OFFICE, BRUNEI DARUSSALAM

greater efforts to build resilience to mitigate and adapt to the effects of climate change "which will have an ongoing and significant impact on the ability to ensure stable and sustainable food production." The declaration also supported integrated approaches to improved nutrition.

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**'Food security is a complex and multifaceted issue requiring multiple, integrated approaches'**

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"Food security is a complex and multifaceted issue requiring multiple, integrated approaches," the declaration said. It recalled the Phnom Penh Declaration on the East Asia Summit Development Initiative issued by leaders during the Seventh East Asia Summit hosted by Cambodia in 2012,

### **Phnom Penh Declaration**

The Phnom Penh Declaration on the East Asia Development Initiative was adopted at the Seventh East Asia Summit chaired by Cambodian Prime Minister Hun Sen on 20 November, 2012. The declaration encourages the 18 countries to "cooperate in promoting food nutrition, especially by improving increasing sustainable agricultural production and productivity, protecting biodiversity, jointly responding to climate change, securing food and energy supplies for the most vulnerable population, especially women and children, and promoting sustainable development."

which encourages the 18 countries to cooperate in promoting food security and nutrition (see



Lao Prime Minister Thongsing Thammavong

PHOTO: SYLVINA HON ZAE LEENA, INFORMATION DEPARTMENT, PRIME MINISTER'S OFFICE, BRUNEI DARUSSALAM

box). The declaration also recalled the commonly accepted definition of food security, adopted by the World Food Summit in 1996. "The four food security pillars of access, availability, utilisation, and stability are intrinsic to this definition," it added.

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**'Essential for ensuring the broader security of the people of our region'**

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Leaders acknowledged that food security is "essential for ensuring the broader security of the people of our region" and recognised that key priority areas of the East Asia Summit — energy, education, finance, environment, disaster mitigation and connectivity — intersected with a range of food security issues. They also

recognised that extreme climatic events such as droughts and floods undermined agricultural productivity and that "unequal access to natural resources, technology and markets create additional challenges in reducing the number of poor and hungry people."

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**'Post-harvest losses along food supply chains and post-consumer food waste significantly undermine food security'**

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Highlighting the need to increase both production and productivity in the agricultural sector, the declaration said responsible agricultural investment played an "important role" in promoting agricultural development and enhancing food



Thai Prime Minister Yingluck Shinawatra

PHOTO: MOHAMMAD MAHDI MARSIDI/PRIME MINISTER'S OFFICE, BRUNEI DARUSSALAM

security and nutrition. At the same time, "post-harvest losses along food supply chains and post-consumer food waste significantly undermine food security," it said. "Eradicating poverty and building the resilience of our people through adequate social protection measures, economic growth promotion, and positive income generation are effective ways of improving food security."

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**'Protectionist measures may result in excessive food price volatility and hinder regional food security'**

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Leaders meanwhile reaffirmed their commitment to achieve the Millennium Development Goals on hunger and poverty. "Participating countries have made steady progress toward the Goals but ...

more work needs to be done to realise them by 2015," the declaration said.

The leaders also reaffirmed their collective commitment to conclude the Doha Development Agenda negotiations of the World Trade Organization "which seek to ensure fair and equitable benefits of multilateral trade for all countries, including the developing world, and particularly least developed countries." Open food markets are "critical to sustainable access to nutritionally diverse food resources," it added. "Protectionist measures may result in excessive food price volatility and hinder regional food security." Transparent information about the status of regional and global food markets and food derivative markets, including supply and demand forecasts and the state of food stocks, "will help increase food market certainty and reduce



Vietnamese Prime Minister Nguyen Tan Dung

PHOTO: MOHAMMAD MAHDI MARSIDI/PRIME MINISTER'S OFFICE, BRUNEI DARUSSALAM

excessive food price volatility," the declaration said.

Leaders acknowledged the need to avoid duplicating East Asia Summit efforts with those of other organisations such as ASEAN Plus Three process (with China, Japan and Korea) as well as the Asia-Pacific Economic Cooperation (APEC) forum, the United Nations Food and Agriculture Organisation (FAO), the Committee on World Food Security (CFS), the Organisation for Economic Cooperation and Development (OECD), the Organisation of Islamic Cooperation (OIC), the Group of Eight (G8) and the Group of Twenty (G20). The latter issued its own declaration on food security at a summit in Saint Petersburg in September that was attended by the Sultan of Brunei in his capacity as ASEAN chair (see pages 18 and 19).



Myanmar President Thein Sein receiving the ASEAN gavel from Brunei's Sultan Hassanal Bolkiah after the Eighth East Asia Summit in Brunei on October 10. Leaders said they 'looked forward' to the recommendations of the new Study Group on Enhancing Food Security through Sustainable Fisheries Management and Marine Environment Conservation at the Ninth East Asia Summit in Myanmar in 2014.

PHOTO: ERNIE ERMA SALIHUDIN/INFORMATION DEPARTMENT/PRIME MINISTER'S OFFICE, BRUNEI DARUSSALAM

# Food security and nutrition emerge among top priorities on global agenda

## World leaders outline new initiative for growth and job opportunities related to food security and nutrition

Food security emerged as one of five major issues on the global development agenda in September as leaders from the Group of Twenty leading industrialised economies met in September. In the Saint Petersburg Development Outlook adopted at September 5-6 summit, the G20 leaders set March, 2014, as the deadline for reviewing "critical opportunities for economic growth and job creation in connection with food security and nutrition" with a particular focusing on low-income countries.

### 'Almost 870 million people suffer from hunger and the vast majority of them live in developing countries'

According to the development outlook, the international community is "grappling with the twin tasks of alleviating immediate suffering and the longer-term challenge of feeding a growing and rapidly urbanising population. Almost 870 million people suffer from hunger and the vast majority of them live in developing countries. If the status quo continues, to feed an expected population of more than 9 billion in 2050, global food production will have to increase by at least 50-70 per cent," the statement said.

"Poverty stands at the root of this challenge," the G20 leaders said, adding that other constraints included population growth triggering more demand for food against slowing productivity, rural poverty lack of infrastructure in low-income countries, underinvestment, food price volatility, growing competition for scarce resources including land and water, climate change, and access to markets.

## Focus on smallholders and family farmers

"Food security and nutrition require sustainable production and productivity growth with a

particular emphasis on smallholder and family farmers development needs, gender equality and women empowerment, decent jobs especially in rural areas, comprehensive rural development, responsible investment, capacity building, transparent and efficient markets, increased resilience, reduction of food losses and wastes, safety nets and better nutrition for everyone. The G20 can best add value through political leadership to foster a coordinated, integrated and longer-term approach in most of these areas."

In addition to the new initiative to review of growth and job opportunities related to food security and nutrition, the G20 leaders vowed to

## Nutrition-sensitive policies and comprehensive social protection

In a declaration, the G20 leaders said food security and nutrition would remain a "top priority" on their agenda. They also recognised the importance of boosting agricultural productivity, investment and trade to strengthen the global food system to promote economic growth and job creation and the need for "nutrition-sensitive policies and comprehensive social protection systems, with particular emphasis on low income countries."

The leaders expressed support for discussions in the World Trade Organization to "respond to legitimate food security concerns, without distorting trade, including those related to carefully targeted policies to protect vulnerable populations."

The declaration also recognised the need for "closer attention" to agricultural markets, noting that the Agricultural Market Information System (AMIS) is generating "better transparency" but "still needs more efforts to be fully implemented." AMIS is a G20 initiative with a secretariat based at the Rome headquarters of the Food and Agriculture Organization (FAO).



Brunei's Sultan Hassanal Bolkiah (left) with Russian President Vladimir Putin (right) at the G20 Summit in Saint Petersburgh in September. The Sultan, who is also prime minister, represented the Lower Mekong countries and other members of the Association of Southeast Asian Nations at the G20 summit in his capacity as ASEAN chairman for 2013.

PHOTO: Фотохост-Агентства

enhance dissemination of best practices on food security and nutrition. This would build on existing initiatives such as network centers of excellence and knowledge sharing platforms on food security and nutrition, as well as preparation for the Second International Conference on Nutrition in Barcelona in 2014.

### **Existing commitments**

The G20 leaders also vowed to continue monitoring and carrying out existing commitments related to food reserves and access to humanitarian food supplies, principles for responsible agricultural investment, agricultural risk management and scaling-up nutrition. In addition, the leaders said they remained committed to fully implementing an Agricultural Market Information System and continuing to share knowledge through meetings of top

scientists, especially on agricultural research and technology.

The other four issues highlighted in the development outlook adopted by the leaders were financial inclusion and remittances, infrastructure, human resource development and domestic resource mobilization.



# Updated information on fish and fisheries in the Mekong Basin

BY ERIC BARAN, SO NAM, PETER DEGEN, CHEN XIAO-YONG AND PETER STARR \*

## A brief review of recent information and research findings about Mekong fish species and fisheries

The Mekong River features exceptional biodiversity, is home to the most intensive inland fishery in the world and contributes to the food security of millions of rural people.

The animal protein intake from aquatic animals averages more than 50 percent in the Lower Mekong Basin, more than three times the world average of 16 percent. Protein intake from aquatic animals in Cambodia exceeds 80 percent.

Per capita consumption of aquatic animals in the basin averages 46 kg/person/year, similar to the Southeast Asian rate of 51 kg/person/year but significantly higher than the world average of 24 kg/person/year.

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### 'The Mekong River has the highest fish biodiversity in the world after the Amazon River'

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The group of Lower Mekong countries stands out as a region of the world with the highest freshwater fish biodiversity per square kilometre. On other continents, only French Guyana and Suriname in South America feature higher or similar fish biodiversity per unit area of land.

The Mekong River has the highest fish biodiversity in the world after the Amazon River with 877 freshwater species recorded, according to a recent compilation of 71 species lists by WorldFish. Endemic fish species represent a significant proportion of about 18 percent.

Thailand and Viet Nam are among the top 12 countries in the world having the largest number of freshwater fish species.

## Fish diversity in the six main reaches

Reach of Lower Mekong	Number of species	Endermic (%)
High mountains	151	12
Low mountains	140	18
Plateau	191	14
Islands and wetlands	267	16
Floodplain	328	11
Delta	484	6

The Tonle Sap Basin has the highest freshwater fish biodiversity in the world after the East African lakes. It has an estimated 296 species (which compares with estimates of 438 in Lake Malawi, 316 in Lake Tanganyika and 225 in Lake Victoria).

The Lower Mekong has three main ecological fish groups. One group, known as white fishes, undertakes long-distance migrations, particularly between lower floodplains and the Mekong mainstream and its major tributaries. These account for at least 37 percent of the total number of species or 34 percent of the catch. Another group, called black fishes, comprises floodplain-resident species with limited lateral migrations from the river on to floodplains and no longitudinal migrations upstream

## Upper Mekong found to have 183 fishes

A new checklist of fishes of Yunnan province in China shows 183 species in the Upper Mekong River, about 30 percent of all fish species in the province and about 12 percent of the freshwater fishes in China. Among the six main river drainages in Yunnan, which accounts for about 40 percent of fish species in the country, the Mekong had the most species after the Pearl River drainage which had 202 species. Forty-eight percent of the species in the Upper Mekong, known as *Lancangjiang* in Chinese, are endemic to the Mekong, the highest rate among the six drainages.

or downstream. These account for about 13 percent of the total number of species or 50 percent of the catch. The third group, grey fishes, is ecologically intermediate between the black and white groups, corresponding to species that do not spend the dry season in floodplain ponds or undertake short-distance migrations in local tributaries. Grey species account for about 50 percent of the total number of species or 16 percent of the catch.

### **'Production from both freshwater capture fisheries and aquaculture was estimated at 3.9 million tonnes in 2010'**

The Lower Mekong Basin's production from both freshwater capture fisheries and aquaculture was estimated at 3.9 million tonnes in 2010, up from an estimated 2.8 million tonnes in 2000. The increase of almost 40 percent was fuelled by a significant expansion of aquaculture production which now accounts for more than half the output. The increase also reflects better improved methods of estimating production from both capture fisheries and aquaculture.

### **'Total first-sale value is estimated at \$3.9 to \$7.0 billion per year'**

Total first-sale value is estimated at \$3.9 to \$7.0 billion per year. But most of the catches are consumed directly by households as part of the rural subsistence economy, which does not appear in national accounts. Inland fisheries nevertheless make significant contributions to the monetised economies of all four riparian countries. Over the past decade, fisheries has sometimes accounted for as much as 12 percent of Cambodia's GDP and 7 percent of Lao GDP. Although proportionally less important, the Mekong fishery sectors in Thailand and Viet Nam add well over \$750 million to the economies of each country annually.

The Lower Mekong Basin's overall fisheries production represents about 43 percent of Africa's production, 24 percent of Europe's production and 19 percent of America's production. It also represents about 12 percent of Southeast Asia's production and 4 percent of production in the whole

of Asia. While overall fisheries production is only about 2 percent of world production, the production of freshwater species in the Lower Mekong Basin is about 20 percent of global inland fish production, more than anywhere else in the world.

*\* Dr Baran is senior scientist with the Mekong regional office of WorldFish in Phnom Penh, Dr So Nam is the coordinator of the MRC Fisheries Programme, Mr Degen is the programme's chief technical advisor, Professor Chen is with the State Key Laboratory of Genetic Resources and Evolution at the Kunming Institute of Zoology of the Chinese Academy of Sciences and Mr Starr is the editor of Catch and Culture*



Silver barbs from the Mekong River and striped snakeheads from Nam Theun 2 Reservoir at Thonhankham Market, Vientiane

PHOTO: MRC

# Science storytelling

BY DENISE YOUNG \*

## History of a revolution in agricultural communications

In the 1970s, Nobel Laureate Norman Borlaug's work on high yielding wheat varieties unleashed unprecedented levels of new funding for developing country agriculture. One of the major recipients was CGIAR, formerly known as the Consultative Group on International Agricultural Research. Founded in 1971, CGIAR's global network of research centers generated research that helped countries like India produce enough food to feed their people and avert famine. But funding slowed after the mid-1980s as funders felt that the problem of food security had been largely solved. While money continued to flow, albeit more slowly, CGIAR officials took a hard look at their programs and decided not only to do a better job of documenting impact, but to generate a new approach to how they communicated the results of their research.

We sat down recently with a group of key actors from that time—communicators from CGIAR Centers Ed Sulzberger, Tiff Harris and Nathan Russell, as well as Ebbe Schiøler from the Danish International Development Agency (DANIDA), to find out what happened.

### You were central figures in the history of CGIAR communications. What happened in the 1980s to funding and why?

**Ed** – It started slowly as funders began voicing concerns about documenting impact, and as we came under fire from NGOs for promoting technology that they claimed failed to benefit smallholder farmers. By the mid-80s, the Centers began to understand that the free-flowing funding that they had come to rely on was becoming scarcer and a small group of communicators were asked to study the problem.

We concluded that the centers were focusing their communications work almost entirely on other scientists and that they needed to reach out to donors and their constituents. Over the course of a decade we basically did a one-eighty; we changed

### Ed Sulzberger

Ed Sulzberger is a fund-raising and public-awareness consultant specializing in developing country agriculture and development issues. He worked at several CGIAR Centers and the CGIAR Secretariat at the World Bank. He is based in Galveston, Texas and currently serves as Chairman of AID for Africa, a US charity that provides funding to development agencies working in Africa.

from being a community of science writers and publishers to a network of communicators that put a premium on reaching out to the public.

**Nathan** – There was also a geo-political angle to the funding issue. In the 1990s, prices of the major staple crops had been declining for nearly 20 years and many funders thought that agricultural research was no longer an urgent priority. The end of the Cold War also changed the way people thought about the Green Revolution, which had been seen by some as a counter-measure to the “Red Revolution.”

### Nathan Russell

Nathan Russell is Head of Corporate Communications at the Center for Tropical Agriculture (CIAT) in Colombia and worked previously at the CGIAR Secretariat at the World Bank. He also worked as a science writer and editor at the International Maize and Wheat Improvement Center (CIMMYT) and International Institute of Tropical Agriculture (IITA).

### How did you make the case to start telling the story differently?

**Tiff** – In 1989 and 1990, the centers started seeing really dramatic cuts in funding, and this caused a big upheaval. In a sense it was a crisis of faith, which some center directors took quite personally. They saw themselves as men of science out

on the front line working for humanity, and many couldn't understand why the rug was being pulled out from underneath them.

One thing we learned was that unless you have senior managers who recognize the importance of good story telling and are willing to invest in it, the problem festers. Fortunately, there was a small group of center Directors and information officers and funders who had the vision to invest in public awareness and fight for it.

### Tiff Harris

Tiff Harris trained as an agricultural and natural resource economist, and started working for the International Maize and Wheat Improvement Center (CIMMYT) in Mexico as a science writer/editor, then as Director of Information Services and ending his 18 years with CIMMYT as the Center's Director of External Relations. In 1999, he joined the World Agroforestry Centre (ICRAF) in Nairobi, Kenya, as the Center's Director of Corporate Services, a position he held until 2005. He is currently a Nairobi-based consultant on communication and fundraising for international agricultural R&D organizations.

**Ed –** While we had realized that public awareness was the way to make our case and that the tide was turning in terms of legitimizing this new approach, we still had to convince the bench scientists and many of the communications folks at the centers. Up until then center communicators basically spent their days editing science papers and producing annual reports, some of which resembled telephone directories. We had to convince the traditional science writers and editors that the game was changing and that funders and policymakers weren't much interested in reading technical reports or learning about the inner workings of a science bureaucracy. One of the most important things we learned was that it's not the organization that sells the science; it's the great stories about the science that sell the organization.

### How does media coverage of research actually lead to a better outcome for funding?

**Ed –** Well, it's not just about raising new money, it's also a matter of keeping what you've got. Unless

your funders have compelling evidence that their money is being put to good use, the people who make decisions about funding see little point in sustaining support. Our job as communicators was to help make the case in top-tier international media for what was happening in the field, namely that our research was having an impact and that hundreds of millions of people were better off for it. This provided the ammunition for our champions in the funding agencies, people like Ebbe Schiøler, who had to argue the case for sustaining their investment in the centers.

**Ebbe –** At DANIDA (the Danish International Development Agency) we weren't seeing stories in the Danish media about CGIAR work. But the fact that the centers began telling their stories helped us build our advocacy work international agricultural research. We believed that the CGIAR was a good cause but we needed continual reinforcement to fight for the funds.

### Ebbe Schiøler

Ebbe Schiøler worked at the Danish International Development Agency for more than two decades in a number of posts. He also served in Zambia as regional director for the Danish "Peace Corps" and later became director of the Danish Volunteer Service. At DANIDA, he headed the development research section and cooperated with the organisation's public awareness office producing regularly articles and books on CGIAR and its impact in the field. He retired in 1999, and is currently based in Denmark as a freelance writer.

Although funding for development aid in Denmark was on the rise in the 1980s, CGIAR was competing for the same pool of funds that organizations like the World Health Organization were targeting. What put them ahead was their approach to showing impact, and they did this by being very transparent, having regular reviews and demonstrating that there was no over-spending. Getting stories into the Danish press helped to reinforce that idea from an independent source. In other words, it wasn't just the centers and their advocates in the civil service saying so, the media was carrying the message and they were doing so in more dramatic ways than we could from the inside.

### **Did it take a long time for this new communications mindset to take hold?**

**Tiff** – We didn't have the internet back then and telephone service to places like the Philippines or Kenya was expensive and unreliable so we organized meetings to talk about science publishing and then met informally and talked about public awareness. It wasn't easy at first, and we had to meet undercover, at places like the Frankfurt Book Fair where our colleagues would go to promote their publications. None of this would have been possible, however, without the support of some of the center Directors and donors like Ebbe Schiøler.

**Nathan** – At first a lot of people thought what we were doing was crass, it seemed unscientific and inappropriate. That was especially so among the rank and file scientists who were accustomed to unrestricted funding, but it was also true of many of our communications colleagues who were entrenched in the world of science publishing.

**Ed** – The big turning point came in 1988 when we convinced a senior editorial writer at the Los Angeles Times to go to Kenya and write about the search for a new vaccine for livestock sleeping sickness. Suddenly we were able to demonstrate that it was possible to tell our story in the top-tier media outlets. But the adjustment took time, it varied from center to center, and some of our colleagues never really got it. Scientists and journalists are trained very differently. A researcher will communicate his or her work through journal articles and scientific fora and then only what they can actually prove, whereas journalists are trained to produce stories that make ordinary people sit up and pay attention.

**Nathan** – For my part, change happened quite by accident. Although I had participated to some extent in the early center's public awareness work, I was still functioning mainly as a science editor in the early 1990s in Colombia. That all changed, however, when my colleague Tom Hargrove was kidnapped by the FARC guerillas and I took over his job. Tom had just led a successful public awareness campaign about a special effort in Rwanda to introduce new crop varieties after the genocide, which generated lots of media coverage. Examples like Tom's set the standard among center information officers and really helped to change not just the way I worked, but the way many of

our colleagues did their jobs. Today, I would say that the centers employ just as many if not more people working in the public awareness area than they do in traditional science publishing.

### **What kinds of stories proved the most successful? Can you give me examples?**

**Ed** – We had a lot of great story material to choose from. That was partly because the Centers did such great science, but also because they kept so many of their best stories under wraps. Linking to the news of the day was key, and that meant focusing on the environment. Remember that this was during the time leading up to the 1992 Earth Summit in Rio. We all felt that our strongest suit rested with the center's genetic resources work and the vast collections of crop materials that had been collected. This represented a big departure from CGIAR's traditional focus on crop productivity and the story of the Green Revolution. From that point on, things unfolded rather quickly. Within a period of just a couple of years, the centers' work was being showcased at the Smithsonian, in National Geographic and in newspapers like the New York Times and the Economist. You couldn't have bought better coverage.

The other thing we did was make a deliberate effort to tell the center's stories from the point of view of the scientists. This was partly to counteract the portrayal of researchers in pop culture as nerds hiding out in their labs or, even worse, as mad scientists out to destroy the world. The idea of the heartless, uncaring researcher was definitely part of the message promoted by center critics in the NGO community. Too often our scientists were characterized as errand boys for multinational companies controlled by the World Bank and the Rockefeller Foundation and there was no one out there putting up a defense, let alone trying to change the narrative. The effort began slowly, of course, but we were really able to road test the idea at the Potato Center in Lima.

### **What's the secret to getting a journalist's attention?**

**Ed** – It helps to have a sound strategy, of course, but luck plays a role too. In the early 90s international journalists were travelling to Peru routinely to cover the terrorism story and the Shining Path guerrillas. The word got around

the press corps that if you took a cab down to the Potato Center, you'd get a good story about potatoes. Apparently, nothing makes a newspaper editor back home happier than a feature story that they don't have to pay extra for. As it turned out, the Potato Center's work was about the only good news coming out of Peru for three or four years. Part of the novelty was that no one could believe that despite the terrorism all this great science was going on. We got a front page Wall Street Journal story out of that as well as major coverage in the Washington Post and many of the major European and Japanese papers.

**Nathan** – What Ed's work in Peru and Tom Hargrove's work in Colombia showed was that linking to the news agenda is really the key. That lesson holds true even today. The 2008 financial crisis did result in donor fatigue, but climate change and the food price crisis of 2008 have provided a context for the media to stay engaged with our work.

### So did all this lead to better levels of funding?

**Nathan** – Yes, we're definitely seeing more funding coming than in the 1990s, although it seems harder to get and there are more strings attached. We're working harder for it, no doubt, and part of that extra effort means doing a better job of getting the word out.

**Ebbe** – It's true what Nathan says. Funding levels did increase, and we saw increasing support for development work in Denmark right up until 2001. But it wasn't only the result of better public awareness work. The battle cry was also about impact, and evaluation. We needed proof of impact, and evidence that money was being well spent. These two things worked hand-in-hand: doing more evaluation to prove impact of research combined with much better storytelling.

### Looking back, what was your biggest achievement?

**Tiff** – Today many funders insist on the importance of communications and the centers are working hard to get their stories out. It's mainstream, but in the 1980s and 90s that wasn't the case. Shifting our focus was a struggle with much hand wringing and endless discussion. People may take this for granted today, but it wasn't an easy sell. You'd think

it would be self-evident, but it's not.

**Ed** – One of our most important achievements was creating the link between communications and fund-raising, an idea that's now being mainstreamed across the CGIAR system. CIAT, where Nathan works, is a good example of how important the concept really is and where it is working. The other lesson learned was that you can't hide behind the science. If you do, you'll probably lose funding and you certainly leave yourself open to attack from people who don't agree with your agenda. It was true in the 80s and 90s and it's even more true in a media culture dominated by social media.

### Consultative Group on International Agricultural Research

The history of CGIAR dates back to 1943, when the Rockefeller Foundation and the Mexican government set up the Office of Special Studies, which became the International Maize and Wheat Improvement Center (CIMMYT). CIMMYT and the International Rice Research Institute (IRRI) developed high-yielding, disease-resistant varieties that dramatically increased production of these staple cereals. In 1970, the Rockefeller Foundation proposed a worldwide network of agricultural research centers under a permanent secretariat. With support from the World Bank, the UN's Food and Agriculture Organization (FAO) and the UN's Development Programme (UNDP), CGIAR was established in 1971 to coordinate international agricultural research efforts aimed at reducing poverty and achieving food security in developing countries.

*Reprinted with permission from Future Earth ([www.futureearth.info](http://www.futureearth.info)), a new 10-year research program aimed at tackling the most urgent challenges of the 21st century related to global sustainability. The program is sponsored by the Science and Technology Alliance for Global Sustainability comprising the International Council for Science (ICSU), the International Social Science Council (ISSC), the Belmont forum of funding agencies, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the United Nations University (UNU). The World Meteorological Organization (WMO) is an observer.*

\* Ms Young is Head of Communications at the International Council for Science in Paris

# Lao PDR submits notification on Don Sahong Hydropower Project

## Technical feasibility study includes fisheries

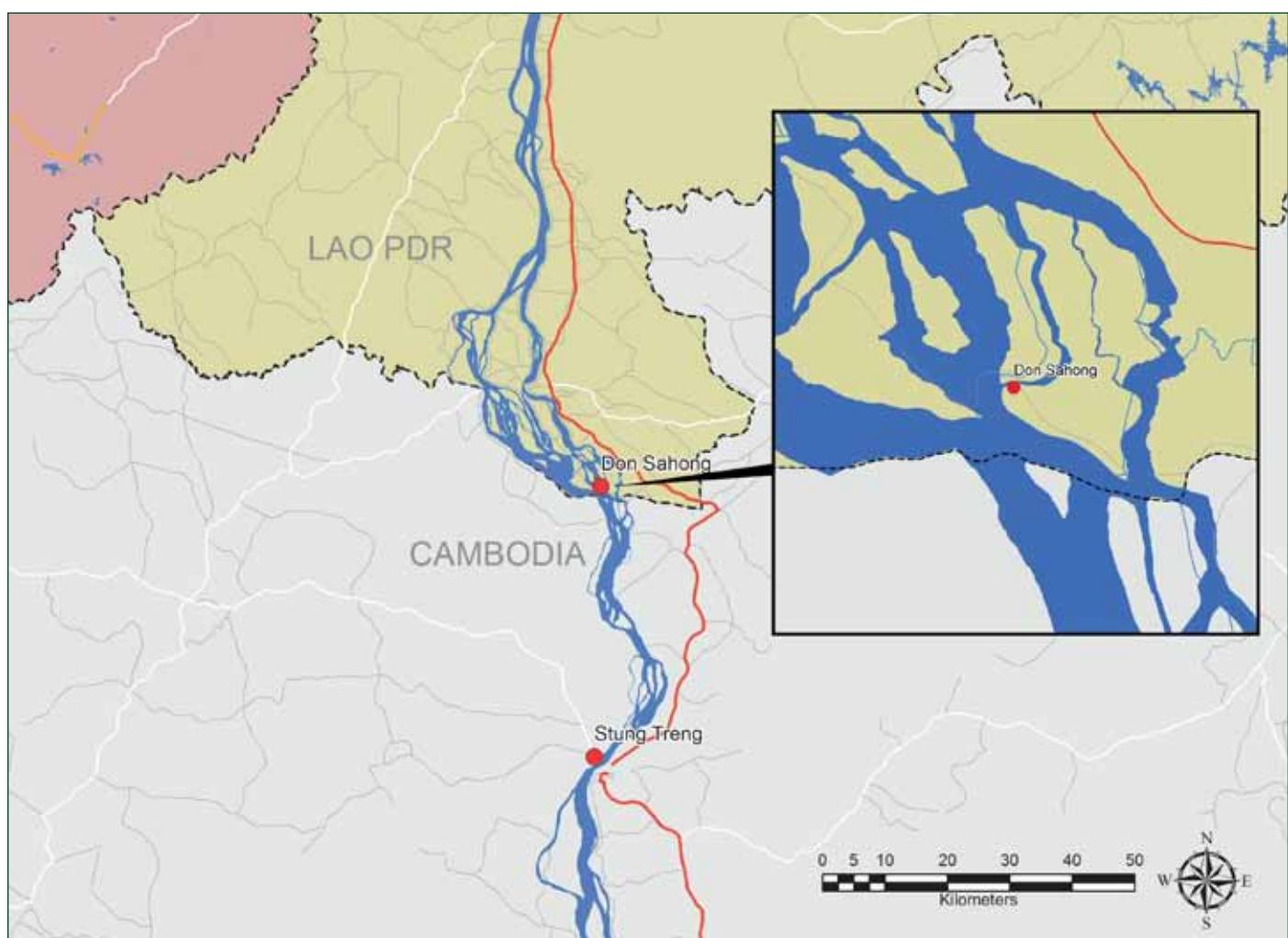
The Lao Government has notified the Mekong River Commission (MRC) of its decision to proceed with the development of the Don Sahong Hydropower Project in the Siphandone area of Southern Laos. The run-of-the-river dam will operate continuously year-round and produce 260 megawatts of electricity.

In its notification, submitted to the MRC Secretariat and dated 30 September 2013,

Lao PDR also provided the complete technical feasibility study, including the project's social and environmental impact assessments and fisheries study which will be shared with the other MRC Member Countries—Cambodia, Thailand and Viet Nam.

## Project expected to finish in 2018

According to the Government of Lao PDR, the project's construction is expected to start in November 2013 and finish by February 2018. The commercial operation is set to begin in May 2018. The energy generated by the project will be



The Don Sahong Hydropower Project is located on a channel known as Hou Sahong

MAP: MRC

fully sold to the national power utility, Electricite du Laos (EDL), to supply the increased domestic power demand.

"Lao PDR submitted the project as an intra-basin water use on the Hou Sahong channel under the process of notification. This will enable the notified Member Countries to foresee the project's water use and any impact stemming from this," says Hans Guttman, Chief Executive Officer of the MRC Secretariat.

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**'Notification is required for year-round intra-basin water-use projects and inter-basin diversion projects on the Mekong's tributaries, and for wet-season water use on the mainstream'**

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As stipulated in the MRC's Procedures for Notification, Prior Consultation and Agreement (PNPCA), the notification process mentioned above is one of the three separate prerequisites for the development of different types of water use projects in the Lower Mekong Basin. Notification is required for year-round intra-basin water-use projects and inter-basin diversion projects on the Mekong's tributaries, and for wet-season water use on the mainstream. Information from this process helps Member Countries plan other water use projects.

The other two processes are Prior Consultation and Agreement. The Prior Consultation applies to proposed water use projects on the mainstream in the dry season, diversion of water from the mainstream to other basins during the wet season and diversion of surplus water to other basins in the dry season. The process for Specific Agreement is required for projects diverting water from the mainstream to other basins in the dry season.

The Lao government submitted a project description which provides a summary of the project's main features. The submission also includes a cumulative impact assessment, environmental and social impact assessments, environmental and social management and monitoring plans, a resettlement action plan and engineering documents.

The MRC Secretariat has submitted the notification and will further provide the documents to the Joint Committee Members of the other three countries for their consideration.

"The PNPCA recognise the adaptive approach for its implementation. In this regard, the Secretariat will be available to facilitate discussion, provide science-based and objective views and further submit any comments on the notification to the Joint Committee," said Mr. Guttman. "Lao PDR has indicated its willingness to further discuss the project with the other Member Countries should there be any concerns or comments."

Until now, in addition to the Don Sahong notification 41 projects on the tributaries of the Mekong have been submitted for the Notification process under the PNPCA—3 projects from Cambodia, 17 from Lao PDR, 2 from Thailand and 19 from Viet Nam. The Xayaburi Hydropower Project is the only one so far to have been proposed on the mainstream and therefore submitted for the Prior Consultation process.

The Don Sahong Project is located in the Khong District of Champasak Province in Lao PDR and situated on the 5-kilometre long Hou Sahong, one of the braided channels of the Mekong River approximately two kilometres upstream of the Lao-Cambodian border. The powerhouse barrage will be 30-metre high and will span across the 100-metre wide downstream end of the channel.

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**'Lao PDR has indicated its willingness to further discuss the project with the other Member Countries'**

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The PNPCA is established under the 1995 Mekong Agreement. It reflects a commitment of the MRC countries to work together to protect the environment and the ecological balance in the basin and prevent harmful effects. For the purposes of the implementation of the Procedures, water use is defined as any use of water which may have a significant impact on the water quality or flow regime of the mainstream.

*The article above comprises the full text of a news release issued by the Mekong River Commission Secretariat on October 3*

# Green growth for the Mekong

By WILLIAM E. TODD \*

## Countries should take care in harnessing the energy of the Mekong and be guided by science and experience

Speaking at the Lower Mekong Initiative Ministerial Meeting in Brunei in July, US Secretary of State John Kerry said, "We need to make sure that the decisions on infrastructure developments, such as dams that affect the Mekong... be made very carefully, very deliberately, very transparently, with all the input they can have from all countries."

Secretary Kerry's remarks highlight the importance of learning from experience and paying close attention to the science when planning dams. I echoed Secretary Kerry's concerns at a recent Lower Mekong Initiative Working Group meeting in Siem Reap, where I acknowledged the importance of hydroelectric power to meet the growing energy demands of Cambodia's rapidly growing economy and emphasized the need for green growth.

It is not a question of whether economic development of the Mekong river basin will occur, but rather how it will occur. Development must be sustainable – a fact that the Cambodian government already recognizes – in order to achieve Cambodia's long-term social, environmental, and economic goals. Recently, a Cambodian delegation visiting the Don Sahong dam project in Laos raised valid concerns about that project's impact on fish populations for Cambodia and the broader Mekong.

Unquestionably, hydroelectric dams are a critical component of Cambodia's infrastructure. As Cambodia's economy continues to expand by more than seven percent per year, its energy needs will also grow and dams will play an important role in meeting consumer demand. Cambodia is working hard to expand access to electricity throughout the country and meet the increasing power needs of the manufacturing sector. Less than one quarter of the country has access to the electrical grid, a fact which underscores the need for development. Cambodia's current and future energy needs have

underpinned the increase in dam construction. Across the region, over 35 dams have been built on the Mekong and its tributaries, and roughly 100 more dams are in various stages of planning and construction on these same waterways. Dam construction is a reality and there needs to be a focus on maximizing the economic benefits of the dam while employing science, experience, and a deliberative process to mitigate the environmental and social impacts, thus ensuring that the economic benefits continue well into the future.

Today, nearly 70 million people in six countries depend on the Mekong River for food, transportation, and economic opportunities. It is one of the most diverse rivers in the world, supporting over 560 unique fish species and 300 vertebrate species. In addition to contributing to the vast quantities of fish and crops, the Mekong and its tributaries support an ecosystem with a biodiversity second only to that of the Amazon. Due to both the economic and environmental importance of the Mekong River, careful consideration must be given to the design and location of these dams.

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**'Unfortunately, there are a number of hydropowered dams already built or under construction that raise serious concerns about flooding, restrictions on fish migration, and the reduction in sediment flow'**

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Unfortunately, there are a number of hydropowered dams already built or under construction that raise serious concerns about flooding, restrictions on fish migration, and the reduction in sediment flow. According to a scientific study of the cumulative impact of the dams currently in the planning phase, the resulting water levels on the Tonle Sap would cause significant additional flooding. Apart from the social and environmental consequences on land, these dams would also have a substantial impact on fish migration and spawning grounds. Another study found that the harm caused to fish populations

by the Sambor Dam alone would reduce yields of fish and other aquatic animals by as much as 182,000 tons or 30 percent. In a country where aquatic resources constitute almost 20 percent of the Cambodian diet – and account for 76 percent of the average person's protein and 37 percent of iron intake – these dams raise real concerns about food security.

The disruption in sediment flow caused by improperly-designed dams will also have substantial environmental and economic effects. The fertility of the Mekong basin and the health of the river itself depend on the continued flow of river sediment. A reduction in sediment leads to less fertility of the flood plains and depletion of the nutrients necessary to sustain aquatic life.

The Natural Heritage Institute, partially funded by USAID, has been working closely with the Cambodian government to examine options to minimize the negative consequences of these dams, which can be minimized through proper siting, design, and operation. Scientific studies offer a number of design modifications that would improve the economic and environmental sustainability of the dam projects on the Mekong River. For example, lowering the height of a dam would allow the passage of more sediment. By lowering the height, some power generation would be sacrificed in the short term, but in the long term, the economic benefits will be greater due to the dam's longer life span and the reduced environmental impact.

Scientific research and extensive experience has also led to innovations that reduce the impact on fish and other aquatic creatures. The experience of dam building in the United States has provided important lessons that engineers have used in designing better dams. In northwest region of the United States, dams built along the Snake River once caused severe harm to salmon populations. Salmon that could freely navigate the Snake River were impeded in their movement and suffered from the interruption of their spawning cycle, thus drastically reducing their numbers. This problem still will take many years to remedy, but some of the poorly designed dams that once caused significant harm have now been re-engineered to reduce ecological impacts. New design features, which are now being considered in Cambodia, allow for the free movement of fish and otherwise

minimize harmful effects on the flow and ecology of the river.

Our two governments have developed a productive partnership to address green growth in the Mekong sub-region. The Lower Mekong Initiative (LMI), a cooperative forum that includes the United States, Cambodia, Laos, Burma, Viet Nam, and Thailand, is an arena for forging the kind of international cooperation necessary to ensure sustainable development of the sub-region. Under the LMI framework, the United States is helping the LMI countries to forge closer ties to one another while providing support in the region. In Cambodia, for example, the United States is funding the Climate Resilient Mekong project, which is designed to examine the environmental impacts caused by hydroelectric dams. Implemented by USAID and other partners, the project is working with government agencies in Cambodia to enhance awareness of downstream impacts and improve planning and decision-making on hydropower development.

USAID is also working with partners who are conducting studies and making recommendations about dam projects. Among those partners are the Natural Heritage Institute and the World Fish Center. In addition, the US Army Corps of Engineers and the Mississippi River Commission consult regularly with the Mekong River Commission, a regional inter-governmental organization working to address the joint management of shared water resources and sustainable development of the Mekong River.

Former US President Theodore Roosevelt once said that a nation does well "if it treats its natural resources as assets which it must turn over to the next generation increased, and not impaired in value." Development of the Mekong sub-region is both necessary and inescapable. The increasing populations of Cambodia, Thailand, Laos, Viet Nam, and Burma will require growing amounts of food and energy. Those countries looking to harness the energy of the Mekong, however, must do so carefully, guided by science and experience.

\* Mr Todd is the United States ambassador to the Kingdom of Cambodia. The above article is an abridged version of his weekly column published by Rasmei Kampuchea in Khmer and the Cambodia Herald in English on November 27.

# Ouk Rabun named agriculture minister in new Cambodian government

HE Dr Ouk Rabun has been appointed Minister of Agriculture, Forestry and Fisheries in the new government formed by Prime Minister Hun Sen in September following national elections in July. A member of the Politburo of the ruling Cambodian People's Party, he joins the ministry from the Ministry of Economy and Finance where he has been working since 1998, most recently as senior secretary of state (deputy minister).

Born in Svay Rieng province in eastern Cambodia in 1951, Dr Ouk Rabun is a former physics and chemistry professor. Following liberation from the Khmer Rouge regime in 1979, he served as director of the Department of Planning at the Ministry of Planning between 1981 and 1985 and twice served as vice minister, initially at the Ministry of Planning (1986 to 1988) and later at

the Ministry of Commerce (1990 to 1993). After national elections in 1993, he served as chairman of the National Assembly Commission on Finance and Banking for five years.

Dr Ouk Rabun obtained a doctorate in economics from the University of National Economics in Viet Nam in 1990 and also holds master and bachelor degrees from the same university. The Southern California University for Professional Studies awarded him with an honorary doctorate in business administration in 1995. Dr Ouk Rabun also studied at the Faculty of Law and Economic Sciences in Phnom Penh for three years after graduating from the Faculty of Pedagogy in 1972. In addition to his native language, the new minister speaks English, French, Russian and Vietnamese.



Dr Ouk Rabun

PHOTO: INTERNATIONAL UNIVERSITY





**Cave prawns (*Macrobrachium yui*) for sale at the morning market in the northern Lao city of Luang Prabang.** Known locally as *khung bo*, this species is usually sold directly to restaurants or villagers and is rarely seen at the market. The prawns in this photo, taken in 2008, were sold for about \$9.50 a kilogram. The species spawns in caves with reproduction peaking in August. For a description of the life cycle of the prawn and efforts to manage stocks in Luang Prabang province, see Page 4 inside.

PHOTO: S. Ito



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