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Catch and Culture - Environment is published three times a year by the office of the Mekong River Commission Secretariat in Phnom Penh, Cambodia, and distributed to over 650 subscribers around the world. The preparation of the newsletter is facilitated by the Environmental Management Division of the MRC. Free email subscriptions are available through the MRC website, www.mrcmekong.org. For information on the cost of hard-copy subscriptions, contact the MRC's Documentation Centre at doc.centre@mrcmekong.org.

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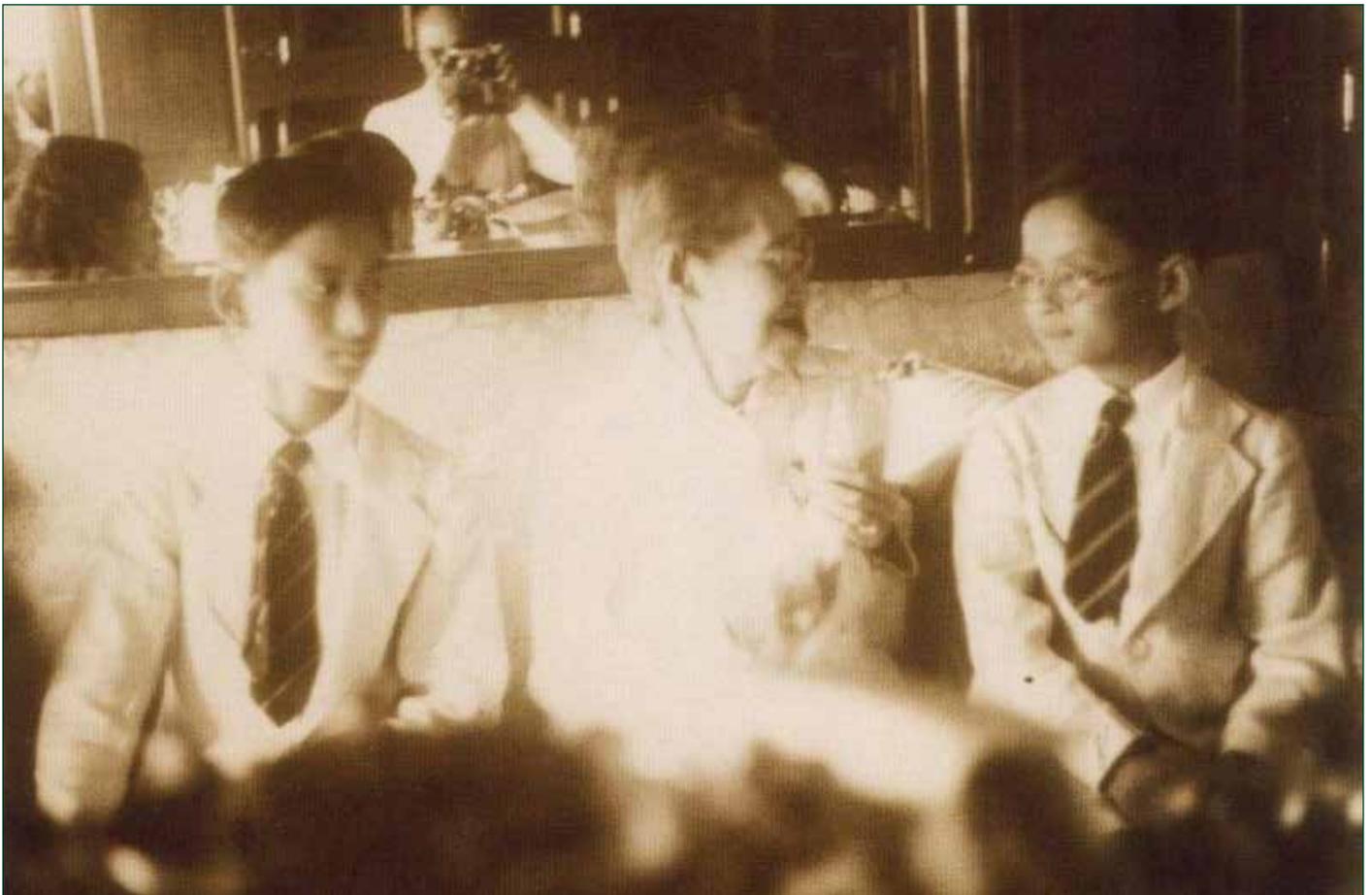
A lifetime commitment to fisheries: King Bhumibol Adulyadej of Thailand

His Majesty Bhumibol Adulyadej, the King of Thailand, died on October 13 at the age of 88. The world's longest reigning monarch left behind a legacy of fisheries and related projects across Thailand spanning more than six decades.

In 1952, six years after ascending the throne at the age of 18, King Bhumibol invited officials of the Royal Department of Fisheries to use wells in the grounds of the Chitralada Palace in Bangkok as fish breeding grounds. The species he chose to propagate was Mozambique tilapia (*Oreochromis mossambicus*), known as *pla mor thet* in Thai.

It was a fast-growing species and, if introduced into rice fields in the planting season, could be harvested by farmers when rice was ready for the sickle. The fish would fatten on small pests and vegetation, and provide farm families with protein. The investment was small and the gains were large. Rice and fish: the staples of the rural Thai diet.

In March 1965, a superior species, Nile tilapia (*Oreochromis niloticus*) was donated by a fellow rural agronomist, Japan's Crown Prince Akihito, later to become the Emperor of Japan. Since then, tens of millions of fingerlings have been given to



King Ananda Mahidol (left) and his brother Prince Bhumibol (right) with their grandmother, Somdej Phra Phanvasa Aiyeeekajao. The prince ascended the throne as the ninth monarch of the Chakri dynasty after the death of his older brother in 1946.

PHOTO: HRH PRINCE RANGSIT PRAYURSAKDI, THE PRINCE OF JAINAD



King Bhumibol at his coronation in the Grand Palace in Bangkok in 1950



In 1952, His Majesty invited officials of the Royal Department of Fisheries to use wells in the grounds of the Chitralada Palace in Bangkok for breeding fish. The species he chose to propagate was Mozambique tilapia (*Oreochromis mossambicus*), introduced in 1949 from Malaysia to Thailand where it is known as *pla mor thet*. In this photo, King Bhumibol and his wife Queen Sirikit release Mozambique tilapia into an earthen pond. On the same day, the Royal Couple also offered fish fry to government officers to release into natural waters.

Thai farmers free of charge to raise in their fields. Today, *pla nin* (black fish), as it is known in Thai, is a favourite on the dining mat of every Thai farm family. At the request of the FAO and UNICEF, His Majesty donated 500,000 tilapia to Bangladesh to alleviate famine and promote the country's own fish propagation programmes.

'Fisheries development should be appropriate to the local area and should aim to develop natural water resources, such as rivers and marshes, both (as) breeding locations and in order to encourage the local inhabitants to derive benefit from such places'

— His Majesty Bhumibol Adulyadej,
King of Thailand

In more recent years, His Majesty's Research Centres have developed several new varieties

of tilapia, common carp (*Cyprinus carpio*) and Mekong giant catfish (*Pangasianodon gigas*) for release into rivers, streams, and ponds. Now seen on many farms are frog ponds where large varieties are propagated for food, a popular item in northern and northeastern diet.

Tilapia released into rice fields was His Majesty's earliest venture. He later concentrated on a core tenet of integrated farming: utilising waste matter from one process as raw material for another. Under an animal husbandry project, pigs, ducks, geese, frogs, and fish were fed plant waste in order to reduce the cost of animal feed.

'Tilapia released into rice fields was His Majesty's earliest venture ... Tilapia is now generating about 100 billion baht (\$3.4 billion) a year in income for villagers'

His Majesty also initiated a project to use water hyacinth as a means of filtering polluted water that flowed from the Makkasan Swamp on the northeastern edge of Bangkok into Saen Saeb, an important canal which flows through the heart of the capital. Since the hyacinth can absorb heavy metals, it cleaned the swamp of toxic pollutants that had been killing fish. Fish later thrived in the sanitised water.

To improve farmer knowledge of new techniques and opportunities, courses in animal husbandry became a mainstay of development efforts by royal agencies and government departments. "Fisheries development should be appropriate to the local area and should aim to develop natural water resources, such as rivers and marshes, both (as) breeding locations and in order to encourage the local inhabitants to derive benefit from such places," His Majesty said. "In addition, vegetables and crops can be cultivated in the surrounding areas. In comparison, newly dug ponds often encounter problems of water shortages and in the event of flooding, the fish will escape."

Earlier this year, the *Bangkok Post* reported that varieties of Nile tilapia were served at a cabinet meeting on March 15 to mark the 50th anniversary of His Majesty's introduction of the fish. The newspaper noted that tilapia is now generating about 100 billion baht (\$3.4 billion)

a year in income for villagers. ML Disnadda Diskul, secretary-general of the Mae Fah Luang Foundation under Royal Patronage and the Royal Initiatives Discovery Foundation (RIDF), said the King named the 50 tilapia received from the Japanese Crown Prince in 1965 as *pla nil* after the Nile River in Africa where the species originated ("*nil*" is pronounced "*nin*" in Thai which also means black)

'The King assigned the Department of Fisheries to regularly distribute tilapia to people for food and farming ... The fish later came to be known as the Chitralada strain of Nile tilapia, a reference to His Majesty's villa in the Dusit Palace compound in Bangkok'

As the fish grew and quickly bred, the King assigned the Department of Fisheries to regularly distribute tilapia to people for food and farming, ML Disnadda reportedly said. The breeding was conducted by the department at 15 fish ponds in Bangkok and other provinces. In 1984, the capacity of the ponds, subsequently reduced to only seven, was increased. The fish later came to be known as the Chitralada strain of Nile tilapia, a reference to His Majesty's palace compound in Bangkok. "The department has proceeded with the project and is distributing about 200,000 tonnes of tilapia to people annually. Given their price of 50-60 baht per kilogramme, this can help people make about 100 billion baht a year," ML Disnadda was quoted as saying.

The newspaper said a Nile tilapia exhibition was held at Government House in Bangkok to mark the King's fish donation. The event was hosted by the Royal Initiatives Discovery Foundation. The exhibition included a food festival featuring tilapia products and materials taken from other royal development projects.

Further reading:

Thailand Today (2011), Ministry of Foreign Affairs of the Kingdom of Thailand, Bangkok. Website (<http://www.thailandtoday.in.th/monarchy>) accessed 28 October, 2016.

Patsara Jikkham (2016), HM's fish serve up a cabinet treat, Bangkok Post, 16 March, 2016



During a state visit to Thailand in 1965, Japan's then Crown Prince Akihito (right) presented King Bhumibol (left) with 50 Nile tilapia (*Oreochromis niloticus*). His Majesty named the fish *pla nil* in Thai after the Nile River which has native populations of the species. In the Thai language, "*pla nil*" is pronounced "*pla nin*" which means "black fish". The former Crown Prince and current Emperor of Japan is an ichthyologist who has conducted extensive research on the taxonomy of species from the Gobiidae family.

The photographic essay on the following ten pages highlights His Majesty's contributions to the fisheries sector over more than 60 years. We are indebted to the Royal Thai Department of Fisheries for sharing these insightful images and would like to especially thank Mr Theerawat Sampawamana, Acting Head of the International Organizations and Multilateral Cooperation Group of the Fisheries Foreign Affairs Division, for his assistance with the captions. We also wish to thank Dr Naruepon Sukumasavin, the MRC Director from Thailand, for his support.



His Majesty and Princess Sirindhorn during the opening ceremony for the Coastal Aquaculture Research Institute in Songkhla Province, 10 September, 1981



His Majesty and then Crown Prince Vajiralongkorn release fish at the Khao Hin Son Royal Project in Chacherngsao Province, 3 August, 1981



His Majesty releases silver barb and rohu fry into the Bandon Pattana Reservoir in Nakhon Phanom Province, 27 November, 1980



His Majesty and Princess Sirindhorn release fish fry during a visit to the Huoy Hong Krai Royal Project in Chiang Mai, 3 February, 1984



His Majesty releases nile tilapia broodstock into an earthen pond on the grounds of the Chitralada Palace, 7 December, 1969



Their Majesties King Bhumibol and Queen Sirikit accompanied by Their Royal Highnesses Princess Sirindhorn and Princess Chulabhorn visiting the Khao Hin Son Royal Development Study Centre, 20 July, 1980



His Majesty visiting a nile tilapia Pen Culture Demonstration Site at the Highland Fisheries Royal Project in Chiang Mai, 8-9 March, 1982



Their Majesties King Bhumibol and Queen Sirikit release fish during a visit to the Fish Pond Culture Royal Project in Cha Um District, Phetchaburi Province, 26 June, 1990



Their Majesties King Bhumibol and Queen Sirikit release fish during a visit to the Fish Pond Culture Royal Project in Cha Um District, Phetchaburi Province, 26 June, 1990



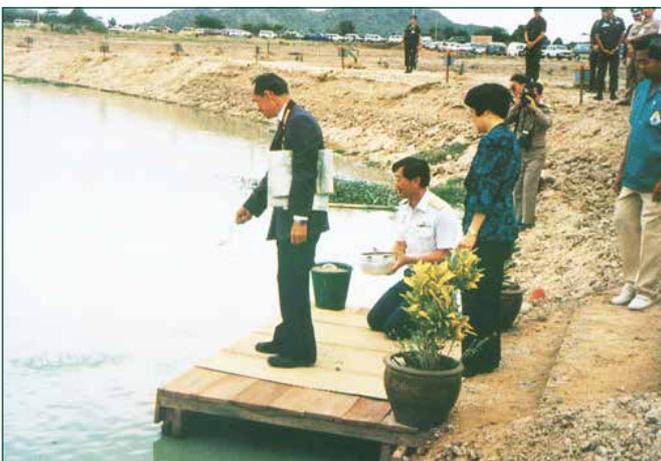
Their Majesties King Bhumibol and Queen Sirikit release fish during a visit to the Fish Pond Culture Royal Project in Cha Um District, Phetchaburi Province, 26 June, 1990



His Majesty always took a map and camera whenever he went to work with people in rural areas



His Majesty observing a water body with his customary camera and map in hand



His Majesty feeds fish with pellets after releasing the animals into an earthen pond, 26 June, 1990



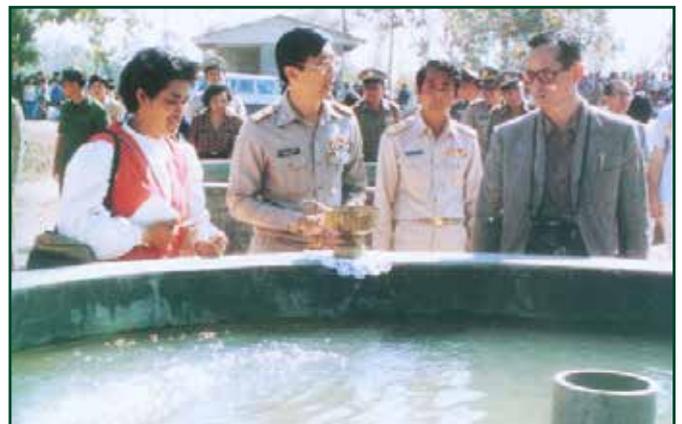
The Thai national flag flies as His Majesty presides over a fish-release ceremony



Their Majesties King Bhumibol and Queen Sirikit at the opening ceremony for the Pasak Chollasit Dam, 25 November, 1999



His Majesty teaching students from Klai Kang Wol School, the king's private school in Hua Hin District in Prachuap Kiri Khan Province, as part of a television program called "Quest for Knowledge" under a royal project in 2001. The project involved satellite broadcasts on a remote education channel for rural children across the country.



His Majesty and Princess Sirindhorn observing fish culture at a cement tank demonstration site.



His Majesty visiting a fish cage culture facility



His Majesty releasing indigenous fishes, including Mekong giant catfish, bagrid catfish and sheatfish, at the Royal-initiated Kum River Basin Development Study Centre in Sakhon Nakhon Province. 23 November, 1992. The Kum River is a tributary of the Mekong.



Royal Cypher and personal flag of His Majesty King Bhumibol



Samdech Techo Hun Sen, Prime Minister of Cambodia, pays his respects to His Majesty King Bhumibol Adulyadej at the Dusit Maha Prasat Throne Hall inside the Grand Palace in Bangkok on October 22

PHOTO: MINISTRY OF FOREIGN AFFAIRS



H.E. Mr. Thongloun Sisoulith, Prime Minister of the Lao People's Democratic Republic, pays his respects to His Majesty King Bhumibol Adulyadej at the Dusit Maha Prasat Throne Hall inside the Grand Palace in Bangkok on October 24

PHOTO: MINISTRY OF FOREIGN AFFAIRS



H.E. Mr. Nguyễn Xuân Phúc, Prime Minister of the Socialist Republic of Viet Nam, pays his respects to His Majesty King Bhumibol Adulyadej at the Dusit Maha Prasat Throne Hall inside the Grand Palace in Bangkok on October 28

PHOTO: MINISTRY OF FOREIGN AFFAIRS

More than 200 critically endangered turtles find new homes in Cambodia

Once thought to be extinct in Cambodia, the southern river terrapin is getting a new lease of life from conservation efforts that have increased chances of its survival

The southern river terrapin (*Batagur affinis*) has long been prized for its flesh and large eggs, so much so that the freshwater turtle is now believed to be extinct in Singapore and Viet Nam. The critically endangered species still occurs in Indonesia, Malaysia and southern Thailand but was also thought to be extinct in Cambodia — until 2001 when the Fisheries Administration and the Wildlife Conservation Society found a small population on the Sre Ambel River in the country's southwest. Egg collectors have since been hired to search for nests and protect them. Hatchlings have been taken into captivity and raised until several years old, increasing their chances of survival before being released back into the wild.

On September 14, WCS announced the transfer of 206 of the turtles to a new breeding and

conservation centre in Mondol Seima District in Koh Kong, a coastal province bordering Thailand. The new facility, known as the Koh Kong Reptile Conservation Centre, is a joint effort between the Fisheries Administration and WCS to save the terrapin, known in Khmer as *anderk reach* which means “royal turtle”.

“With very few royal turtles left in the wild and many threats to their survival, Cambodia's national reptile is facing a high risk of extinction,” said Ouk Vibol, director of the Conservation Department at the Fisheries Administration. “By protecting nests and head starting the hatchlings, we are increasing the chances of survival for this important species for Cambodia. To further protect the species we've constructed a purpose-built centre to give royal turtles the best start to life possible.”

‘Species at great risk’

In a statement, WCS said the turtle was “now facing threats to its very survival due to habitat



Southern river terrapin in Sre Ambel River, the only place in Cambodia where the species is still found in the wild

PHOTO: THIDA LEIPER/WCS

loss caused by increased sand dredging, illegal clearance of flooded forest, and illegal fishing. A recent increase in disturbance from dredging along the Sre Ambel River in Koh Kong Province — the only place where the species is still found in Cambodia — is putting this species at great risk.”

Ross Sinclair, country director for WCS in Cambodia, said the new centre may develop into an ecotourism site to generate revenue for conservation. “We hope in time to have other species like Siamese crocodiles at the centre,” he said. The Siamese crocodile (*Crocodylus siamensis*) is widely farmed in Cambodia, Lao PDR and Viet Nam although wild populations are also considered critically endangered.

On October 19, the WCS announced the establishment of a second captive population with a further 25 terrapins moved to another site at the Angkor Centre for Conservation of Biodiversity (ACCB) in Siem Reap. “When managing captive populations of very rare animals, it is international best practice to not keep all individuals in one location,” Ouk Vibol said. “So-called ‘assurance colonies’ help manage the risks of hazards such as natural disasters, major disease outbreaks or other unforeseen incidents, so that if such a catastrophe happens the entire population is not affected.”

Michael Meyerhoff, the ACCB project manager, said the animals had “adapted very well to the new environment” in Siem Reap and could be regularly seen at the surface. “Due to the young age of the females, breeding is still not likely for the next couple of years. ACCB’s veterinarian and animal keeping staff will continue to monitor their well-being and follow up on regular health-checks” he said.

In 2015, WCS and the Fisheries Administration released 21 southern river terrapins fitted with transmitters. WCS said monitoring showed that three of the animals had travelled down the Sre Ambel River, along the Gulf of Thailand coast and up another river system, ending up more than 97 km from where they were released.

The river terrapin has recently been split into two species (see box). The Red List of the International Union for the Conservation of Nature (IUCN) has listed the chelonian as critically endangered since 2000, based on a range-wide evaluation in 1999. The turtle is listed in Appendix 1 of the Convention

Taxonomy

Praschag *et al.* (2007, 2008) showed that the widespread species *Batagur baska* comprised at least two genetically distinct species, and separated out *B. affinis* for the southern species occupying southern Thailand, Peninsular Malaysia, and Sumatra in Indonesia, retaining the name *B. baska* for the more northern species from India, Bangladesh, and Myanmar. Praschag *et al.* (2009) further assessed the genetics and taxonomic status of the Cambodian relict population and eastern Peninsular Malaysian populations and described them as the new subspecies *B. affinis edwardmollii*, with *B. a. affinis* occurring in western Peninsular Malaysia and Sumatra.

Source: IUCN

Further reading

Praschag, P., Holloway, R., Georges, A., Päckert, M., Hundsdoerfer, A.K. and Fritz, U. 2009. A new subspecies of *Batagur affinis* (Cantor, 1847), one of the world’s most critically endangered chelonians (Testudines: Geoemydidae). *Zootaxa* 2233: 57–68.

Praschag, P., Hundsdoerfer, A.K. and Fritz, U. 2007. Phylogeny and taxonomy of endangered South and South-east Asian freshwater turtles elucidated by mtDNA sequence variation (Testudines: Geoemydidae: *Batagur*, *Callagur*, *Hardella*, *Kachuga*, *Pangshura*). *Zoologica Scripta* 36: 429–442.

Praschag, P., Sommer, R.S., McCarthy, C., Gemel, R. and Fritz, U. 2008. Naming one of the world’s rarest chelonians, the southern *Batagur*. *Zootaxa* 1758: 61–68

on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which prohibits international trade except when the purpose of importing is not commercial. Evaluations of “critically endangered” indicate that a species is at “extremely high risk” of extinction. According to IUCN, the population used to extend into the Mekong Delta of Viet Nam “where a few animals may still persist” and also upstream to the Tonle Sap Lake in Cambodia.

Further reading

Horne, B.D., Chan, E.H., Platt, S.G. & Moll, E.O. 2016. *Batagur affinis*. *The IUCN Red List of Threatened Species 2016*: e.T170501A1315041. <http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T170501A1315041.en>

Marrakech Action Proclamation for climate and sustainable development

The Paris Climate Change Agreement entered into force on 4 November, 2016, 30 days after the date on which at least 55 Parties to the Convention accounting for at least 55 percent of global greenhouse gas emissions had deposited their instruments of ratification, acceptance, approval or accession. Between 15 and 18 November, the first session of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement took place in Marrakech in Morocco. World leaders attending the meeting adopted the statement below.

“ We, Heads of State, Government, and Delegations, gathered in Marrakech, on African soil, for the High-Level Segment of the 22nd Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, the 12th Session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol, and the 1st Session of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement, at the gracious invitation of His Majesty the King of Morocco, Mohammed VI, issue this proclamation to signal a shift towards a new era of implementation and action on climate and sustainable development.

Our climate is warming at an alarming and unprecedented rate and we have an urgent duty to respond.

We welcome the Paris Agreement, adopted under the Convention, its rapid entry into force, with its ambitious goals, its inclusive nature and its reflection of equity and common but differentiated responsibilities and respective capabilities, in the light of different national circumstances, and we affirm our commitment to its full implementation.

Indeed, this year, we have seen extraordinary momentum on climate change worldwide,

and in many multilateral fora. This momentum is irreversible – it is being driven not only by governments, but by science, business and global action of all types at all levels.

Our task now is to rapidly build on that momentum, together, moving forward purposefully to reduce greenhouse gas emissions and to foster adaptation efforts, thereby benefiting and supporting the 2030 Agenda for Sustainable Development and its Sustainable Development Goals.

We call for the highest political commitment to combat climate change, as a matter of urgent priority.

We call for strong solidarity with those countries most vulnerable to the impacts of climate change, and underscore the need to support efforts aimed to enhance their adaptive capacity, strengthen resilience and reduce vulnerability.

We call for all Parties to strengthen and support efforts to eradicate poverty, ensure food security and to take stringent action to deal with climate change challenges in agriculture.

We call for urgently raising ambition and strengthening cooperation amongst ourselves to close the gap between current emissions trajectories and the pathway needed to meet the long-term temperature goals of the Paris Agreement.

We call for an increase in the volume, flow and access to finance for climate projects, alongside improved capacity and technology, including from developed to developing countries.

We the Developed Country Parties reaffirm our USD \$100 billion mobilization goal.

We, unanimously, call for further climate action and support, well in advance of 2020, taking into account the specific needs and special circumstances of developing countries, the

UN Secretary-General welcomes Proclamation

Following the adoption of the Marrakech Action Proclamation, UN Secretary-General Ban Ki-Moon issued the following statement on 18 November:

The Secretary-General welcomes the outcome of the United Nations Climate Change Conference (COP22) that concluded today in Marrakech, Morocco. At the Conference, Governments, many represented at the highest level, issued the Marrakech Action Proclamation. This, as well as decisions adopted in Marrakech, powerfully reaffirms continued strong global support for the Paris Agreement on climate change and demonstrates the determination of all Governments to implement the agreement as quickly as possible.

The Secretary-General notes that all countries understand that climate action is essential for their security, economic prosperity and the health and well-being of their citizens. Global cooperation rooted in strong national action is essential, the Secretary-General noted, saying that no country, irrespective of its size or strength, is immune



Ban Ki-moon speaking to reporters in Marrakech

from the impacts of climate change and no country can afford to tackle the climate challenge alone.

In Marrakech, parties advanced on the rule book for the implementation of the Paris Agreement. The agreement entered into force on 4 November, years ahead of expectations.

As of today, 111 countries, accounting for more than 75 percent of global greenhouse-gas emissions, have ratified the agreement.

The Secretary-General applauds the bold leadership shown by many of the world's most vulnerable countries, many of whom are in Africa, to strengthen their ambition and to move as quickly as possible towards a 100 percent clean energy, climate-resilient future.

As the global thermostat continues to rise, the Secretary-General renewed his call for all

countries and all sectors of society to significantly increase their ambition and redouble their efforts to reduce greenhouse-gas emissions. He also called on developed countries to deliver on their pledge to mobilize \$100 billion per year by 2020 in support of climate action by developing countries.

least developed countries and those particularly vulnerable to the adverse impacts of climate change.

We who are Parties to the Kyoto Protocol encourage the ratification of the Doha Amendment.

We, collectively, call on all non-state actors to join us for immediate and ambitious action and mobilization, building on their important achievements, noting the many initiatives and the Marrakech Partnership for Global Climate Action itself, launched in Marrakech.

The transition in our economies required to meet the objectives of the Paris Agreement provides a substantial positive opportunity for increased prosperity and sustainable development.

The Marrakech Conference marks an important inflection point in our commitment to bring together the whole international community to tackle one of the greatest challenges of our time.

As we now turn towards implementation and action, we reiterate our resolve to inspire solidarity, hope and opportunity for current and future generations. ”

Asian lawmakers encourage integrated water resource management

Amid prospects of ‘severe’ water shortages in the region by 2050, parliamentarians identify fulfilling basic needs and safeguarding ecosystems as management priorities

Lawmakers from 23 countries across Asia including MRC members Cambodia, Lao PDR, Thailand and Viet Nam have called for integrated management to curb the scarcity and pollution of freshwater resources. The call came in a resolution adopted by the Ninth Plenary Session of the Asian Parliamentary Assembly (APA) held in Siem Reap between November 27 and December 2, 2016. The resolution said members of the

assembly were “deeply concerned” that about one billion people across Asia could face “severe” water shortages by 2050. Asian governments should therefore focus national policies on water and sanitation issues and contribute towards international efforts in resolving these issues.

The Ninth Plenary Session of APA was attended by members of parliament from Afghanistan, Bahrain, Bangladesh, Bhutan, Cambodia, China, Cyprus, Indonesia, Iran, Iraq, Jordan, DPR Korea, Lao PDR, Lebanon, Pakistan, Palestine, Russia, Saudi Arabia, Thailand, Turkey, United Arab Emirates and Viet Nam. It was opened by Cambodian National Assembly President



Cambodian National Assembly President Samdech Heng Samrin addressing the Ninth Plenary Session of the Asian Parliamentary Assembly in Siem Reap on November 29

PHOTO: NATIONAL ASSEMBLY OF CAMBODIA

Samdech Heng Samrin, who assumed the two-year APA presidency in late 2015, and chaired by Dr Nguon Nhel, Second Vice President of the Cambodian National Assembly.

Members of the assembly welcomed the inclusion of water and sanitation among 17 Sustainable Development Goals (SDGs) developed by the United Nations to end poverty, protect the

planet and ensure prosperity for all (see below). Countries adopted the set of goals in September 2015 with specific targets to be achieved over 15 years. The APA resolution also welcomed the acceptance of safe drinking water and sanitation as a human right by the UN General Assembly and Human Rights Council.

Continued on page 26 ...

Clean water and sanitation is the sixth of the 17 sustainable development goals adopted in 2015 under the UN's 2030 Agenda for Sustainable Development. Goal 6 aims to ensure the availability and sustainable management of water and sanitation for all. It is scheduled to be reviewed at a High-Level Political Forum on Sustainable Development in 2018. The goal currently has the following targets:



6.1

By 2030, achieve universal and equitable access to safe and affordable drinking water for all

6.2

By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

6.3

By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

6.4

By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially

reduce the number of people suffering from water scarcity

6.5

By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

6.6

By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

6.a

By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

6.b

Support and strengthen the participation of local communities in improving water and sanitation management

Source: UN Sustainable Development Knowledge Platform



Cambodian delegates to the Ninth Plenary Session of the Asian Parliamentary Assembly in Siem Reap on November 29, 2016

PHOTO: NATIONAL ASSEMBLY OF CAMBODIA



Thai delegates to the Ninth Plenary Session of the Asian Parliamentary Assembly in Siem Reap on November 29, 2016

PHOTO: NATIONAL ASSEMBLY OF CAMBODIA



Lao delegates to the Ninth Plenary Session of the Asian Parliamentary Assembly in Siem Reap on November 29, 2016

PHOTO: NATIONAL ASSEMBLY OF CAMBODIA



Vietnamese delegates to the Ninth Plenary Session of the Asian Parliamentary Assembly in Siem Reap on November 29, 2016

PHOTO: NATIONAL ASSEMBLY OF CAMBODIA

... continued from page 23

In calling for Integrated Water Resources Management (IWRM), the resolution referred to the definition used by the Global Water Partnership, an international network set up in Stockholm in 1996. This defines IWRM as "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems." The APA resolution highlighted the need for "reducing widespread scarcity and pollution of freshwater resources in many regions" with priority given to "fulfillment of basic needs and safeguarding of ecosystems in developing and using water resources."

Critical role for lawmakers

The role of parliamentarians is "critical" for implementing a human rights approach to water and sanitation "including particularly the adoption of legislative measures in the implementation of their human rights obligations," the resolution said. APA Member Parliaments were asked to "urge their respective governments to cooperate with their regions to discuss the water scarcity challenge all over Asian countries and to study in depth the causes of the water scarcity and to provide appropriate solutions and strategies to overcome this challenge." Parliamentarians were also asked to "vigorously engage with executives" to build inclusive frameworks between states to reduce the impacts of climate change in terms of water scarcity and flooding.

States and development partners

The resolution reaffirmed that APA Member States have "primary responsibility" to ensure full realization of the SDGs. Member States were asked to "ensure financing according to the available resources for the provision of affordable water and sanitation, and to develop indicators and data collection mechanisms to monitor progress and to identify shortcomings." Member States were also asked to support advanced technology transfers from developed to developing countries in Asia and share good practices for efficient allocation of water. At the same time, however, the resolution underlined the "important role" for the international community in achieving the SDGs. Development partners should therefore "harmonize their strategies with the national initiatives and plans of APA Members related to safe drinking water and sanitation."

Further reading

<http://www.asianparliament.org/uploads/Documents/Plenary/2016/Report%20of%209th%20Plenary.pdf>



Dr Nguon Nhel, Second Vice President of the Cambodian National Assembly, addressing delegates on December 1 in his capacity as chairman of the Ninth Plenary Session of the Asian Parliamentary Assembly

PHOTO: NATIONAL ASSEMBLY OF CAMBODIA

Mekong River Commission reaffirms role as platform for water diplomacy

German government supports MRC's first ever workshop on water diplomacy

The Mekong River Commission is not only a technical body to provide scientific information for better water resources management in the Lower Mekong Basin but also a platform for water diplomacy to support water negotiations among the member countries, according to outcomes of its first ever workshop on water diplomacy at the MRC Secretariat in Vientiane in November.

Supported by the German government, the two-day Regional Workshop on Water Diplomacy in the Mekong River Basin offered an opportunity for representatives of Cambodia, Lao PDR, Thailand and Viet Nam as well as experts of the MRC Secretariat to candidly discuss its roles in the past and future. The opportunity reaffirmed the MRC's role as a platform for water diplomacy where the member countries with different national interests and priorities negotiate, within an agreed legal framework, optimal use of shared water resources for the benefits of the region and its people. Workshop participants included two members of the MRC Joint Committee, foreign affairs officials, and experts from the World Bank, United Nations Department of Political Affairs and international river basin organizations.

“Achieving and ensuring water security is an imminent 21st century challenge. It demands preventive action,” said German Ambassador to Lao PDR Michael Grau in his opening remarks at the workshop. “MRC has a comprehensive mandate and the opportunity to lay the foundation for long-term sustainable development along

the Mekong. It can increasingly link its scientific work to the policy domain.”

During the workshop from 29 to 30 November, the participants exchanged practical experience in water diplomacy at national and regional levels through group discussions, and learned lessons from other international river basin organisations on how to respond to and deal with challenges and opportunities in sharing of water resources. The experts particularly looked at how water diplomacy could prevent tensions in a river basin and what legal, procedural and institutional frameworks could support such efforts.

The participants further discussed how the reaffirmed role can be linked to the MRC work on basin-wide strategies and procedural rules on water cooperation, and recommended to strengthen the regional water diplomacy through better information sharing and wider stakeholder engagement.

Reflecting such discussions, the participants agreed to develop a short report with action plan to materialise those recommendations in coming months.



Industry-science dialogue creates breakthrough in biosphere stewardship

New Swedish initiative plans to connect wild capture fisheries to aquaculture businesses, European and North American companies to Asian companies and the global seafood business to science

Eight of the world's largest seafood companies have issued a ten-point statement committing to action on ocean stewardship following the first "Keystone Dialogue" between scientists and business leaders (see page 30). Through the dialogues – a new approach to engage major international businesses in global sustainability challenges – companies have committed to improving transparency and traceability and reducing illegal, unreported and unregulated (IUU) fishing in their supply chains (see page 31).

Reducing antibiotic use in aquaculture, greenhouse gas emissions and plastic pollution will also now be prioritized. And the businesses commit to eliminating any products in their supply chains that may have been obtained through

"modern slavery including forced, bonded and child labour".

The joint statement released on December 14, 2016, says signatories "represent a global force, not only in the operation of the seafood industry, but also in contributing to a resilient planet." It was signed by the two largest companies by revenues (Maruha Nichiro Corp and Nippon Suisan Kaisha Ltd of Japan), two of the largest tuna companies in the world (Thai Union Group PCL and Soyhr Korea's Dongwon Industries), the two largest salmon farmers (Marine Harvest ASA of Norway and Cermaq, a subsidiary of Japan's Mitsubishi Corp) and the two largest aquafeed companies (Skretting, a subsidiary of Nutreco of the Netherlands, and Cargill Aqua Nutrition of the United States).

"We depend on a stable and resilient planet for human prosperity. However, science is already providing evidence that we have entered the Anthropocene, an epoch where humanity is now



challenging the stability of Earth and its ocean,” the statement said.

To implement the commitments the companies plan to create a new initiative - Seafood Business for Ocean Stewardship – that will, for the first time, connect wild capture fisheries to aquaculture businesses, connect European and North American companies to Asian companies and connect the global seafood business to science.

According to research published by a group of U.S. scientists in 2016, good management of global fisheries could lead to increase in annual catches of over 16 million metric tons and \$53 billion in profit compared with remaining on the current trajectory.

“The small concentration of multinational companies means that CEOs are significant leverage points to effectively engage in transforming the entire seafood sector towards more sustainable practices,” said Johan



Prof Rockström

Rockström, director of the Stockholm Resilience Centre.

Jonathon Porritt, founding director of UK-based Forum for the Future, a key supporter of the dialogue, said it was “hugely encouraging to see these leading companies in the global seafood industry making such critical commitments to help protect the world's ocean. This combination of world-class science and inspirational corporate leadership is a powerful one - and I've no doubt we'll need to see a lot more of it over the next few years.”

Myoung W Lee, chief executive of Dongwon, one of the largest tuna companies, said it was “remarkable that seafood companies came together to discuss the sustainability and development of the seafood industry and lay grounds for ocean stewardship. I am honored to have contributed to such a significant, historic event and will ensure that Dongwon does our part to uphold the



Mr Lee



Background to the Keystone Dialogue

The inaugural dialogue, initiated by the Stockholm Resilience Centre, took place 11-13 November, 2016, in the Maldives under the patronage of Crown Princess Victoria of Sweden – advocate for the UN Sustainable Development Goals (SDGs). The initiative was a unique meeting between CEOs, senior leadership of major seafood companies, leading scientists from the Stockholm Resilience Centre and four advisors — Dr Jane Lubchenco of Oregon State University, Sanford Ltd chief executive Volker Kuntzsch, Marine Stewardship Council chief executive Rupert Howes and Ambassador Magnus Robach, the Swedish Ambassador to Japan.

The dialogue was the first between scientists and “keystone actors” a term coined in 2015 by Carl Folke and Henrik Österblom, science directors at the Stockholm Resilience Centre. Keystone species play a disproportionate role in ecosystems. Increasingly, large transnational corporations now play this role, for example, in the ocean and in rainforests. Österblom led research identifying the keystone actors in the world’s oceans. The team identified 13



Prof Folke



Dr Österblom

transnational corporations controlling 11-16% of wild marine catch and up to 40% of the largest and most valuable fish stocks.

“We invited the leaders of these companies to a dialogue to build trust and develop a common understanding about the state of the ocean,” said Österblom. “We were delighted so many companies accepted our offer. This shows they are aware of the urgency of the situation and willing to engage in these issues.”

Source: Stockholm Resilience Centre



HRH Crown Princess Victoria of Sweden opening the three-day meeting of business leaders and scientists in the Maldives in November

PHOTO: JEAN-BAPTISTE JOUFFRAY

Ten-point commitment

In the joint statement released on December 14, 2016, eight of the world's largest seafood companies committed to act on the following:

- improve transparency and traceability in our own operations, and work together to share information and best practice, building on existing industry partnerships and collaborations;
- engage in concerted efforts to help reduce IUU fishing and seek to ensure that IUU products and endangered species are not present in our supply chains;
- engage in science-based efforts to improve fisheries and aquaculture management and productivity, through collaboration with industry, regulators and civil society;
- engage in concerted efforts to eliminate any form of modern slavery including forced, bonded and child labour in our supply chains;
- work towards reducing the use of antibiotics in aquaculture;
- reduce the use of plastics in seafood operations, and encourage global efforts to reduce plastic pollution;
- reduce our own greenhouse gas emissions;
- secure new growth in aquaculture, by deploying best practices in preventive health management, including improved regulatory regimes;
- Collaborate and invest in the development and deployment of emerging approaches and technologies for sustainable fisheries and aquaculture; and
- support novel initiatives and innovations for ocean stewardship.

agreement."

Cermaq chief executive Geir Molvik said the company was "very much engaged in Sustainable Development Goal 14 – life below water – and have encompassed the SDGs in our business strategy. Working with other keystone actors in the global seafood sector is important because it's only through partnerships we can efficiently pull in the same direction and make significant changes."



Mr Molvik

Einar Wathne, president of Cargill Aqua Nutrition, a major aquafeed company, said: "This initiative has a truly global perspective, from east to west. That makes me believe that we will have a powerful impact when addressing the challenges we have in our oceans and marine ecosystems, with the UN Sustainable Development Goals as our guideline."



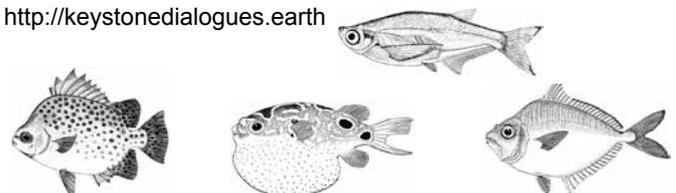
Mr Wathne

The dialogue will be followed up with additional meetings and dialogue between science and business. A next meeting is already scheduled for 2017, where more concrete joint actions will be identified.

"Creating more awareness of the opportunities – and business necessities – of managing seafood sustainably should be a key priority for CEOs," said Jean-Baptiste Jouffray, PhD candidate at the Stockholm Resilience Centre and co-organiser of the event.

Further reading

<http://kestonedialogues.earth>



New Environmental Management Division takes shape at MRC

The MRC Secretariat has established an Environmental Management Division under its new structure. The main focuses of the division are environmental monitoring, planning, assessment and management in the Lower Mekong Basin as well as state of the basin reporting. Led by a director, the division consists of five technical staff and two support staff:

Dr Truong Hong Tien, a Vietnamese citizen, is **Director of the Environmental Management Division**. Prior to joining the division, he worked as director of the Technical Support Division of the MRC Secretariat. Dr Tien obtained his bachelor's degree in irrigation and drainage engineering from Moscow Water Resources University in 1989. He also obtained a master's degree in water resources development from the Asian Institute of Technology in 1996 and a doctoral degree in civil engineering and environment from Nagoya University in Japan in 2000. Between 2001 and 2003, Dr Tien conducted a post-doctoral study in the field of soil and groundwater contamination and remediation at Nagoya University. His experience includes integrated water resources management, basin development planning, trans-boundary impact assessment, flood risk management and climate change adaptation.



Dr Tien

Dr So Nam, a Cambodian national, holds the position of **Chief Environment**



Dr So Nam

Management Officer. He was previously Coordinator of the MRC Fisheries Programme between 2012 and 2016. Before that, he was Director of the Inland Fisheries Research and Development Institute of Cambodia. Dr So Nam holds a BSc in fisheries from the Royal University of Agriculture in Phnom Penh, an MSc in aquaculture from the University of Ghent in Belgium and Wageningen University of Agriculture in the Netherlands and a PhD in biology from Catholic University of Leuven in Belgium. He has more than 20 years experience in environment, fisheries and aquaculture research, development and management in various countries including Cambodia, Lao PDR, Thailand, Viet Nam, Belgium, the Netherlands, France, the United States and Canada. Dr So Nam has written more than 100 technical reports related to fisheries, environment and aquaculture in the English language.

Dr Phattareeya Suanrattanachai from Thailand holds the position of **Fisheries Management Specialist**. She previously worked as a socio-economic specialist at the MRC's Basin Development Plan Programme. Before that, she spent 17 years with the Southeast Asian Fisheries Development Center (SEAFDEC) in Bangkok including five years on a project that adopted a community-based fisheries management approach to coastal resources management in Malaysia and Cambodia. Dr Phattareeya has also worked for the International Union for the Conservation of Nature and Natural Resources (IUCN) as a project manager in the field of sustainable development in Chumphon Province in Thailand. She holds a BSc in fisheries from Kasetsart University and an



Dr Phattareeya

MBA in finance and banking from Ramkamheang University in Thailand as well as an MSc in fisheries and a PhD in fisheries science from Kagoshima University in Japan.

Dr Prayooth Yaowakhan, also from Thailand, holds the position of **Ecosystem and Wetland Specialist**.

He previously worked as project manager and senior consultant at ERM-Siam Co Ltd. Dr Prayooth has more than 16 years experience in the assessment, management and monitoring of watersheds and aquatic ecosystems as well as community development, capacity building and policy analysis and review in various stakeholder-engaged projects in Thailand and other Southeast Asian countries including Lao PDR, Cambodia, Viet Nam, Myanmar and Indonesia. These have included projects funded by the United Nations Development Program (UNDP) and the International Finance Corporation (IFC) of the World Bank. He holds a BSc in environmental biology and a PhD in environmental biology and biodiversity from Mahidol University in Thailand.



Dr Prayooth

Mr Nuon Vanna from Cambodia holds the position of **Fisheries and Aquatic Ecology Officer**. He has 13 years experience in natural resource management and climate change adaptation, capacity building, project design and management as well as livelihood and biological research. Mr Vanna previously worked as a technical officer for the MRC Climate Change and Adaptation Initiative where he was responsible for a basin-wide assessment of climate change impacts on ecosystems and biodiversity including six taxonomic groups (fishes, birds, mammals,



Mr Vanna

plants, reptiles and amphibians). Before that, he worked as national monitoring expert for Birdlife International. Mr Vanna completed a BSc in fisheries science at the Royal University of Agriculture in Cambodia 2003 and an MSc in aquatic resource management at the Asian Institute of Technology in 2008.

Dr Dao Thi Ngoc Hoang from Viet Nam holds the position of **Water Quality Officer**.

Dr Hoang was previously a faculty member at Da Nang University in central Viet Nam where she taught and conducted research in the field of environmental science, focussing on water resources, water quality analysis and monitoring, wastewater treatment technology, natural resource management, and sustainable development assessment. She also supervised students on research projects related to environmental science. Dr. Hoang holds a BEng in environmental engineering from Da Nang University of Technology, an MSc in environmental science and policy from Clark University in the United States and a Doctor of Engineering in energy and environmental systems from Nagaoka University of Technology in Japan.



Dr Hoang

The MRC Secretariat is recruiting two support staff for the new division — a secretary and an administrative assistant — who are scheduled to be on board from mid-February 2017. Initially located in Phnom Penh, the Environmental Management Division is relocating to Vientiane in January. The relocation follows a decision by the MRC Council at its 23rd meeting in Pakse in November to have a single location for the MRC Secretariat.

Further reading

<http://www.mrcmekong.org/news-and-events/news/the-23rd-mrc-council-meeting-approves-one-secretariat-office-relocation-plan/>

Lao Ministry of Agriculture and Forestry hosts international fishway conference

The Australian Centre for International Agricultural Research (ACIAR) and the United States Department of the Interior support conference bringing together government agencies, developers, researchers, local provincial and district leaders and natural resource managers to help share knowledge on the successes and opportunities regarding fisheries sustainability in the region

The Lao Ministry of Agriculture and Forestry hosted an international conference in November, 2016, to discuss innovative approaches to securing regional fisheries productivity as irrigation

and other river development projects expand. Held in partnership with the National University of Laos, the Lower Mekong Fish Passage Conference in Vientiane from 14 to 17 November brought together more than 150 experts to discuss how applied research could be used to enhance policy and decision-making across the region.

Drawn from the public and private sectors as well as academic institutions, the experts in river development, fish passage and aquatic ecosystem management were mainly from Australia and the United States but also Europe, South America and the neighbouring countries of Cambodia, Myanmar, Thailand and Viet Nam as well as Indonesia.



Delegates at the opening of the Lower Mekong Fish Passage Conference in Vientiane on 14 November, 2016

PHOTO: TOM RAYNER

"The region is currently experiencing an unprecedented boom in river development projects which will increase agricultural and power generation output for years to come," said Dr Bounthong Bouahom, director-general of the National Agriculture and Forestry Research Institute (NAFRI).

'Effective fish passage to maintain the fisheries resource for generations to come'

"It is important that our development activities do not impact our most important food source, fish," Dr Bounthong said. "Mekong fish species are highly migratory, requiring access to different habitats at many life stages.

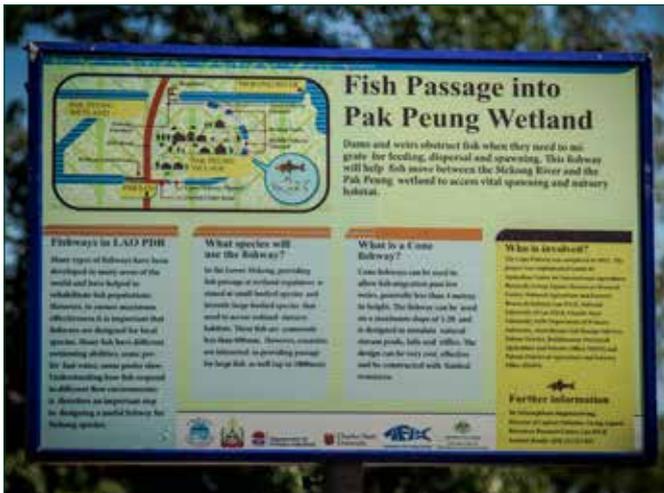
"As governments, we need to produce power and supply water to our communities. But at the same time, we must ensure effective fish passage to

maintain the fisheries resource for generations to come."

The four-day conference was hosted by the Living Aquatic Resources Research Centre (LARReC), NAFRI and the Lao Ministry of Agriculture and Forestry, with the support of the Australian Centre for International Agricultural Research (ACIAR) and the United States Agency for International Development (USAID).

ACIAR has long been involved in Lao fishway research. In April, the Australian government agency launched a five-year project to quantify biophysical and community impacts of improved fish passage (see *Catch and Culture*, Vol 22, No 1). This is among the largest ACIAR fisheries projects since it began supporting research in the sector in 1997. It is also the fifth ACIAR project in a series to find the most appropriate technology to boost Lao fisheries production where barriers to fish migration have been built.





Sign at the demonstration fishway site developed by ACIAR at the Pak Peung Wetland in the Bolikhamxay Province

PHOTO: TOM RAYNER



Conference delegates examine a fish-friendly downstream regulator

PHOTO: TOM RAYNER



Water flowing down the cone fishway at the demonstration site

PHOTO: TOM RAYNER



Close-up of the cone fishway

PHOTO: TOM RAYNER



Juvenile fish observed moving upstream to access nursery habitats during the field visit on 16 November, 2016

PHOTOS: TOM RAYNER



During the conference, delegates took part in a one-day field trip to visit the Pak Peung Wetland in the central province of Bolikhamxay, where a fishway demonstration site developed by ACIAR is located (see opposite page). USAID meanwhile sponsored a dialogue seminar aimed at agreeing on an approach to develop national guidelines for monitoring fish passage at mainstream dams along the Mekong River. Held on the sidelines of the conference, the one-day seminar, involved fisheries and other international experts as well as representatives of the Lao energy, fisheries and natural resource management sectors (see page 38).

LARReC and NAFRI organised the conference with Charles Sturt University in Australia and the United States Department of the Interior. Other partners were the New South Wales Department of Primary Industries in Australia, National University of Laos and the Pacific Northwest National Laboratory in the United States.

Background

Lao fisheries are economically significant, being important to livelihoods and food security. The average Lao citizen consumes 48 kg of fish per year, almost eight times the amount of pork, beef or chicken. This makes fish an essential source of protein, calcium and micronutrients for both adults and children. Preserving fisheries productivity is therefore critical to meet poverty reduction targets. But most Mekong fish are migratory, requiring access to spawning, feeding and nursery habitats at various stages of their life cycles. River development activities, such as irrigation and hydropower, are threatening the resource base.

Engineering solutions can minimise fisheries-related impacts. In Lao PDR, however, few have been developed. Absence of such information has led to river development advancing without considering fisheries impacts. Recent surveys have found that much Lao irrigation development is not registered with the central government. Several thousand irrigation schemes exist in some catchments, and each obstruct fish migration to some degree. In many areas, farmers are already reporting reduced fisheries productivity upstream of areas where irrigation schemes have been developed. These observations are largely because the irrigation schemes block access to essential fish habitat and the resource base is declining in response.

In the Lower Mekong Basin, irrigation networks are expected to expand by more than 250 percent over the next two decades. Current hydropower output (3,325 MW) is expected to rise at an annual rate of 7 percent over the same period with 134 new dams. These projects challenge the long-term sustainability of the world's most productive inland fishery, which amounts to 2 percent of the global fisheries yield while contributing more than 50 percent of the animal protein and supporting the livelihoods of close to 70 million people in the basin.

Similar development in the Amazon River in South America led to a 70 percent decrease in fisheries production. In the United States, the Columbia River salmon fishery crashed following dam construction, requiring investment of \$7 billion from hydropower profits into applied research to partly restore fisheries over 50 years.

Such experience shows that it is always cheaper and more effective to consider technology to reduce fisheries impacts at the time of construction rather than after completion. The key is using robust science to identify, evaluate and mitigate the effects of river development. Without effective mitigation strategies, capture fisheries in the Lower Mekong Basin are therefore also expected to decline substantially, affecting a major source of animal protein and income.

ACIAR has supported a program of work that has achieved substantial fish-passage outcomes in Lao PDR. For over ten years, research teams have been working to improve the compatibility of river infrastructure like weirs and irrigation gates with maintenance of healthy fisheries. Work has combined Mekong fish ecology with hydraulic engineering to develop a range of fish-passage solutions at low-level weirs that are currently being rolled out across the region.

The US Department of the Interior is also promoting sound social and environmental safeguards for hydropower-related infrastructure and associated activities in the region through the Smart Infrastructure for the Mekong (SIM) Program. Announced in 2013, the SIM Program is an implementation tool of the long-term Lower Mekong Initiative (LMI), a partnership among Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam and the United States launched in 2009.

Lao PDR agrees to develop fish-passage monitoring guidelines

First draft of guidelines expected in March next year

Lao government officials and the National University of Laos have agreed on an approach to develop national guidelines for monitoring fish passage at mainstream dams along the Mekong River (see opposite for details in Lao). The decision to initiate the process came during a one-day dialogue seminar sponsored by USAID, held on the sidelines of an international fish passage conference in Vientiane from 14 to 17 November, 2016 (see page 34).

Based on the agreement, officials from the Ministry of Energy and Mines, the Ministry of Agriculture

and Forestry, and the Ministry of Natural Resources and Environment plan to develop a first draft of the guidelines by March next year. The guidelines will aim to maintain fisheries productivity and biodiversity, develop a database on migrating species, and evaluate the effectiveness of fish-passage systems.



Lao Energy and Mines Vice Minister Viraphonh Viravong addressing the seminar on 16 November.

PHOTO: LEM CHAMNAP



United States Deputy Chief of Mission Michael Kleine (right) speaking as Lao Energy and Mines Vice Minister Viraphonh Viravong (centre) looks on at the one-day seminar held on the sidelines of the Lower Mekong Fish Passage Conference in Vientiane from 14 to 17 November. At left is Dr Michael Roy, Senior Technical Adviser to the Smart Infrastructure for the Mekong (SIM) Program of the United States Department of the Interior.

PHOTO: LEM CHAMNAP

ສປປລາວ ວາງແຜນທີ່ຈະພັດທະນາລະບົບຕິດຕາມກວດກາທາງຜ່ານປ່າ

ລັດຖະບານລາວ ແລະ ມະຫາວິທະຍາໄລແຫ່ງຊາດ ໄດ້ຕົກລົງ ເຫັນດີໃນການສ້າງແບບແນະນຳແຫ່ງຊາດເພື່ອຕິດຕາມທາງ ຜ່ານຂອງປ່າຕາມບັນດາເຂື່ອນໄຟຟ້າຕ່າງໆຕາມແມ່ນ້ຳຂອງ. ແນວຄິດລິເລີ່ມຂະບວນການດັ່ງກ່າວແມ່ນໄດ້ຮັບການຕົກລົງ ໃນກອງປະຊຸມສາກົນທີ່ໄດ້ຈັດຂຶ້ນທີ່ນະຄອນຫຼວງວຽງຈັນໃນ ອາທິດທີ່ຜ່ານມາເຊິ່ງມີຈຸດປະສົງປົກປ້ອງການປະມົງລະດັບ ພາກພື້ນໃນຂະນະທີ່ການພັດທະນາເຂື່ອນໄຟຟ້າແມ່ນກຳລັງ ມີການຂະຫຍາຍຕົວ.

ອີງຕາມຂໍ້ຕົກລົງ, ເຈົ້າໜ້າທີ່ຈາກກະຊວງພະລັງງານ ແລະ ບໍ່ແຮ່, ກະຊວງກະຊິກຳ ແລະ ປ່າໄມ້ ແລະ ກະຊວງຊັບພະຍາ ກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ໄດ້ມີແຜນທີ່ຈະພັດທະ ນາຮ່າງແນະນຳທຳອິດໃຫ້ໄດ້ພາຍໃນເດືອນມີນາ ປີ2017. ຮ່າງດັ່ງກ່າວຈະມີຈຸດປະສົງເພື່ອຮັກສາຜົນຜະລິດທາງການ ປະມົງ ແລະ ຊີວະນານາພັນ, ການພັດທະນາຖານຂໍ້ມູນກ່ຽວ ກັບການອົບພະຍົບຂອງບັນດາສາຍພັນຕ່າງໆຂອງປ່າ ແລະ ປະເມີນປະສິດທິຜົນຂອງລະບົບທາງຜ່ານປ່າ.

ພະນະທ່ານ ວິຣະພົນ ວິຣະວົງ, ລັດຖະມົນຕີກະຊວງພະລັງ ງານ ແລະ ບໍ່ແຮ່ ໄດ້ກ່າວທີ່ກອງປະຊຸມວ່າ: ບໍລິມາດການຜລິດ ພະລັງງານຕໍ່ປີຂອງປະເທດລາວແມ່ນ ສ່ວນໃຫຍ່ມາຈາກ ພະລັງງານໄຟຟ້າ, ເຊິ່ງໄດ້ຖືກຄາດຄະເນຈະເພີ່ມຂຶ້ນຈາກ ປະຈຸບັນ 6000ມວ ມາເປັນ ປະມານ 10000ມວ ໃນປີ 2020 ແລະ ປະມານ 20000ມວ ໃນປີ 2030 ເຊິ່ງ ໃນນັ້ນ 75 ສ່ວນ ຮ້ອຍແມ່ນຈະຖືກສົ່ງອອກໄປປະເທດໄທ ແລະ ຫວຽດນາມ.

ອີງຕາມການເພີ່ມຂຶ້ນທີ່ຄາດຄະເນໄວ້ກ່ຽວກັບພະລັງງານ ໄຟຟ້າ, ການສ້າງຮ່າງແນະນຳນີ້ແມ່ນມີຄວາມສຳຄັນພິເສດ. ທ່ານ ຄຳໂສ ກູໂພຄຳ, ຮອງຮົວໜ້າກົມນະໂຍບາຍ ແລະ ວາງ ແຜນພະລັງງານ, ກະຊວງພະລັງງານ ແລະ ບໍ່ແຮ່, ໄດ້ຕ້ອນ ຮັບການເຮັດວຽກຮ່ວມມືຂອງການຮ່າງບົດແນະນຳກ່ຽວກັບ ການພັດທະນາລະບົບຕິດຕາມກວດກາທາງຜ່ານປ່າ ແລະ

ກ່າວວ່າ: ຂ້າພະເຈົ້າຫວັງຢາງຢິ່ງທີ່ຈະໄດ້ເພິ່ງພາອາໄສບັນດ າທ່ານເພື່ອການຮ່ວມມືຢ່າງຕໍ່ເນື່ອງໃນອານາຄົດທີ່ຈະມາເຖິງ ເພື່ອພັດທະນາຮ່າງແນະນຳເຫຼົ່ານີ້.

ທ່ານຮອງຫຼຸດສະຫະລັດອາເມລິກາ ໄມໂຄ ຄລາຍໄດ້ກ່າວໃນ ກອງປະຊຸມວ່າ: ໃນສະຫະລັດອາເມລິກາໃນການອອກແບບ ທີ່ບໍ່ດີພໍ ໄດ້ສົ່ງຜົນກະທົບໃຫ້ເກີດການຫລຸດລົງຂອງຈຳນວນ ປ່າຊາວມ້ອນໃນແມ່ນ້ຳໂຄລຳເບຍຢ່າງໜ້າຕົກໃຈ. ດ້ວຍ ເຫດຜົນດັ່ງກ່າວ, ສະຫະລັດອາເມລິກາ ໄດ້ໃຊ້ເງິນທຶນໃນການ ພື້ນພູປະມານ 7 ຕື້ໂດລ້າ. ຈາກບົດຮຽນດັ່ງກ່າວສະຫລຸບ ໄດ້ ວ່າ, ການປະເມີນຜົນກະທົບຂອງໂຄງການ ກ່ອນທີ່ຈະເລີ່ມ ການກໍ່ສ້າງແມ່ນ ມີປະສິດທິຜົນຫລາຍກ່ວາ.

ກອງປະຊຸມລະດັບພາກພື້ນກ່ຽວກັບທາງຜ່ານປ່າລະຫວ່າງ ວັນທີ 14-17 ພະຈິກ 2016 ທີ່ຜ່ານມາໄດ້ເຕົ້າໂຮມຊ່ຽວຊານ ຫຼາຍກ່ວາ 150 ທ່ານ ທີ່ມາຈາກ ອາເມລິກາ, ອົດສະຕາລີ ໂດຍ ສະເພາະ, ນອກນີ້ຍັງມີຜູ້ຊ່ຽວຊານມາຈາກ ທະວີບເອີຣົບ, ອາເມລິກາໃຕ້, ປະເທດກຳປູເຈຍ, ມຽນມາ, ໄທ, ຫວຽດນາມ ແລະ ອິນໂດເນເຊຍ. ສູນຄົ້ນຄ້ວາການປະມົງ LARReC ແລະ ສະຖາບັນຄົ້ນຄ້ວາກະສິກຳແລະປ່າໄມ້ແຫ່ງຊາດ NAFRI ໄດ້ ຈັດກອງປະຊຸມດັ່ງກ່າວໂດຍໄດ້ຮັບການສະໜັບສະໜູນໂດຍສະ ຖາບັນຄົ້ນຄ້ວາກະສິກຳຮ່າງຊາດຂອງປະເທດອົດສະຕາລີ (ACIAR) ແລະ ອົງການພັດທະນາສາກົນສະຫະລັດອາເມລິ ກາ (USAID). ຄູ່ຮ່ວມງານອື່ນໆໄດ້ແກ່, ມະຫາວິທະຍາໄລ ຈາວສະເຕີ (Charles Sturt) ຂອງປະເທດອົດສະຕາລີ ແລະ ກະຊວງພາຍໃນຂອງປະເທດສະຫະລັດອາເມລິກາ (United States Department of the Interior) ກົມອຸສະຫະກຳ ລັດ ນິວເຊີແກວ ປະເທດອົດສະຕາລີ (New South Wales Department of Primary Industries), ມະຫາວິທະຍາໄລ ແຫ່ງຊາດລາວ ແລະ ຫ້ອງທົດລອງ ປາຊີຟິກ ຕາເວັນຕົກສູງ ເໜືອ (Pacific Northwest National Laboratory) ປະເທດສະຫະລັດອາເມລິກາ.



Dr Oudom Phonekampheng, Dean of the Faculty of Agriculture at the National University of Laos, leads the discussion on approaches for developing fish-passage monitoring guidelines at the one-day seminar on 16 November, 2016

PHOTO: LEM CHAMNAP



Participants at the one-day seminar on fish-passage monitoring on 16 November, 2016, held on the sidelines of the Lower Mekong Fish Passage Conference

PHOTO: LEM CHAMNAP

Speaking at the seminar, Lao Energy and Mines Vice Minister Viraphonh Viravong said that the country's annual energy production capacity, mostly from hydropower, was forecast to rise from the current level of 6,000 MW to about 10,000 MW in 2020 and some 20,000 MW by 2030 with about three quarters being exported to Thailand and Viet Nam.

Given the expected increase in hydropower production, developing these guidelines is especially important. Mr. Khamso Kouphokham, deputy director general of the Department of Energy Policy and Planning at the Ministry of Energy and Mines, welcomed the work to begin developing fish-passage monitoring guidelines. "I hope that we can count on many of you for continued collaboration in the months and years ahead as we develop and refine these guidelines,"

he told the seminar.

US Deputy Chief of Mission Michael Kleine said, "In the United States, poorly designed dams nearly wiped out salmon from the Columbia River. As a result, approximately USD 7 billion is now being spent to restore fish stocks in this one river alone. The lesson is clear: it is far cheaper to identify, evaluate and mitigate the effects of river development before starting construction." He went on to say, "I applaud the efforts of this conference to address these challenges."

The four-day Lower Mekong Fish Passage Conference brought together more than 150 experts, mainly from Australia and the United States but also Europe, South America, Cambodia, Myanmar, Thailand, Viet Nam and Indonesia.



in Vientiane from 14 to 17 November

Retention of PIT tags in selected Mekong fishes in Lao PDR

BY BETTINA E. GRIEVE *

A new study shows that Passive Integrated Transponder tags are an effective method to use on selected Mekong fish species and could form the basis for future migration studies

Fish are cryptic animals that move between and among habitats in order to complete essential life history stages. Global river development from human activities is negatively harming fish populations by impacting the ability of fish to move and migrate. Specifically, hydropower dams are acting as blocks to fish migration routes, limiting fish population's access to seek refuge, feed, spawn or disperse. The Mekong River is a tropical river system in South East Asia currently experiencing substantial development, which is a threat to fish migration. Therefore, data is urgently needed to understand these negative effects on fish populations and to develop mitigation strategies to protect fish populations in the future. Understanding the relationship of fish movement and food security is required to understand the role fish play in broader ecosystem processes, and technology has a substantial role to play in this progression.

Scientists frequently use electronic Passive Integrated Transponder (PIT) tags, implantable glass capsules incorporating a microchip, as a method to quantify fish migrations. PIT tags have been successfully used globally, but to date, no PIT tagging studies have been performed on any of the species of fish that reside in the Lower Mekong Basin. Furthermore, no studies have been undertaken to validate whether the critical requirements for tagging studies are valid for PIT tags in the region. Prior to investing in large scale tagging infrastructure to measure fish migrations, it is important to ensure a reliable tagging method is developed to underpin data collection and interpretation strategies. The aim of this thesis is to determine the best physical location to apply PIT tags; chest, gut or shoulder, in two species



The study used 12.5 mm PIT tags. The image on the left shows the small glass capsule which contains a microchip and a chip capacitor surrounded by a copper wire coil. The image on the right shows PIT tag sizes compared to a ruler.

PHOTO: BIOMARK

of selected Mekong River fishes. In addition, to determine if there is a difference in PIT tag retention and mortality rates between tag locations and to investigate if weight change differs between the treatments.

This study was conducted at the Living Aquatic Resources Research Centre (LARReC) at Nongteng in Vientiane, Laos, from 6 June to 26 July 2016. It is impossible to assess tagging suitability over the full complement of 1,200 fish species in the Lower Mekong Basin in such a short term study, so species were selected based on a set of key selection criteria. The two species that fulfilled these requirements were *Pangasianodon hypophthalmus* (Striped Catfish) and *Hypsibarbus malcolmi* (Goldfin Tinfoil Barbs).

Experiments were conducted on two captive populations of Striped Catfish (n = 160) and Goldfin Tinfoil Barbs (n = 160). Fish were checked daily for mortalities and tag rejections over a period of 50 days. All fish had their weights measured and recorded, and their bodies dissected to inspect migration of tag within the body.

High retention rates

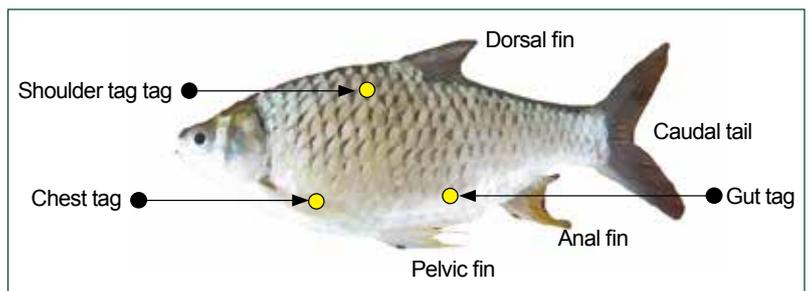
The overall retention rate of PIT tags was high for

Striped Catfish (94.27%) and Goldfin Tinfoil Barbs (91.67%). There was no difference in the tag rejection rates between the tagged treatments for both species. There was no PIT-tag-induced mortality for Striped Catfish (survival 100%) and only one for Goldfin Tinfoil Barbs. The only mortality event for Goldfin Tinfoil Barbs (survival 86.88%) was related to a water quality issue and not tagging location. There were no significant differences in mortality rates between the different tag locations for Goldfin Tinfoil Barbs. Change in weight was dependent on the starting weight for Striped Catfish, however, there was no significant difference in weight change between the treatments. The weight change between the start and end of 50 days was independent of the starting weight for Goldfin Tinfoil Barbs, with no difference in weight change between the different tag locations.

The major factor that affected mortality in this study was issues with water quality. The natural biology of the fish and laboratory conditions aided fin clip growth, resulting in control fish and fish that had shed their tags being indistinguishable. Therefore, fish husbandry is essential for survival of fish and fin clipping should not be used as a method for group identification for fast growing tropical Mekong species. This study demonstrated PIT tags are an effective method to use on selected Mekong species and could form the basis for migration studies in the future. Considering there were no differences in retention rates, or survival and growth between tagging location, suggests that any PIT tag location site could be used for Striped Catfish and Goldfin Tinfoil Barbs. Based on the Laos diet being heavily reliant on its inland fisheries (being a landlocked country), there is a risk of humans consuming or biting into glass-PIT tags. Tags inserted into the chest and shoulder regions are more likely to be eaten. Therefore, in Laos, the most suitable location for tagging would be the gut region in large species, as the gut is often removed prior to consumption.

Conclusion

PIT tagging has substantially advanced the ability of fisheries' researchers and managers to understand the scale and reasons for fish movement and migration. PIT tagging technology has specific limitations, which need



PIT tag treatments (chest, gut, shoulder) to corresponding locations on fish's body. Fin clips applied to differentiate between tagged locations externally: Chest tag, pelvic fin clipped; gut tag, anal fin clipped; shoulder tag, dorsal fin clipped; and the control group, caudal tail fin clipped. Illustration example of a Goldfin Tinfoil Barb ventrally compressed body.

PHOTO: BETTINA E. GRIEVE

to be considered in the context of the research questions being addressed. In areas where limitations have been considered, and substantial planning has been undertaken, PIT tagging studies have improved conservation outcomes for many different species and led to altered management practices. Experiences from other river systems suggest that validating the correct PIT tagging technique in conjunction with a well-designed tagging program will be an effective and efficient mechanism to obtain reliable data to inform such decisions. Most data advances, however, have been limited to a few key species. There are many species worldwide where no information on fish migration is known and thus knowledge on critical aspects of life history is lacking.

In tropical rivers, filling these knowledge gaps is essential considering the unprecedented degree of human development activities underway, which are expected to impact fish populations in a broader sense. The present study provides an insight into appropriate tagging methods for Mekong River fish for laterally compressed and dorso-ventrally compressed body shapes. As it is necessary to understand the swimming ability and migratory behaviour of target species before fishways are designed, PIT tagging applications within the Lower Mekong Basin will be essential to ensure fish are protected both now and into the future.

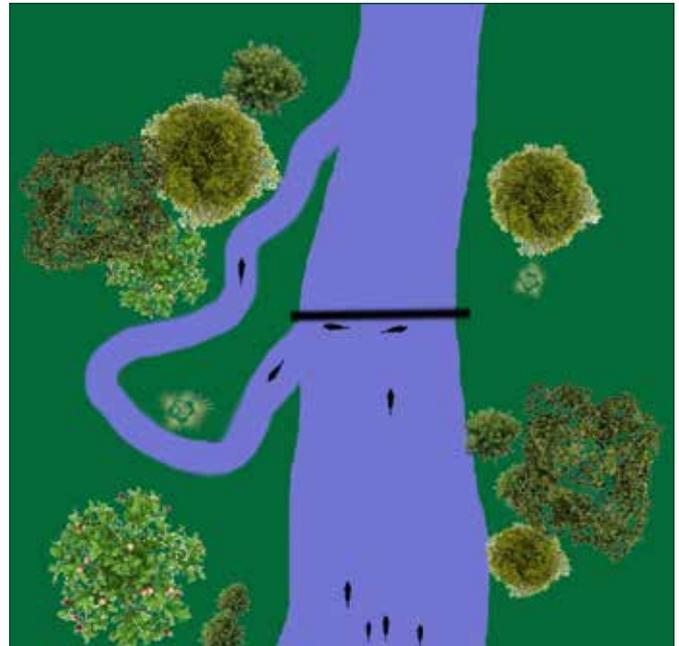
** Ms Grieve is a Bachelor of Science (Honours) graduate from School of Environmental Sciences at Charles Sturt University in Australia. The article is a summary of a paper she completed in October, 2016. Ms Grieve was the lead author of the presentation "Optimising PIT Tagging for Lower Mekong Species" which was delivered to the Lower Mekong Fish Passage Conference on 17 November by Dr Lee Baumgartner, freshwater fish ecologist at the Institute for Land, Water and Society at Charles Sturt University.*

Approaches to mitigation works at the Don Sahong hydropower project site

Seven fish passage works have been completed in channels of the Mekong around the construction site for a new dam scheduled to start operating in 2019. More works are planned over the coming decade.

Construction of the Don Sahong Hydropower Project on the Mekong River at Khone Falls in southern Lao PDR began in January 2016 and is scheduled to be completed in 2019 with a dam that will be 25 metres high, an impact area of 4.6 km² and a reservoir of 2.8 km². The Don Sahong project is much smaller than all other proposed Mekong mainstream projects and many Mekong tributary dams. For example the Lower Sesan 2 project in Cambodia, currently under construction, will flood 335 km², and Nam Ngum Dam in Lao PDR, completed in 1972, has a reservoir covering 470 km².

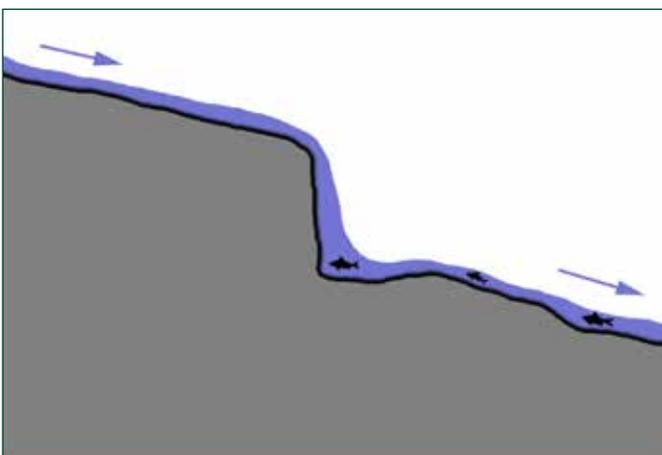
The effects of the Don Sahong project on Mekong River flows and sediment transport are not regionally significant, as the Mekong River Commission (MRC) found in 2014*. Fish and fisheries are, however, very important regionally and the dam will block one of seven Mekong anabranch channels which flow across Khone Falls. Following baseline monitoring between



Bypass channel around a waterfall

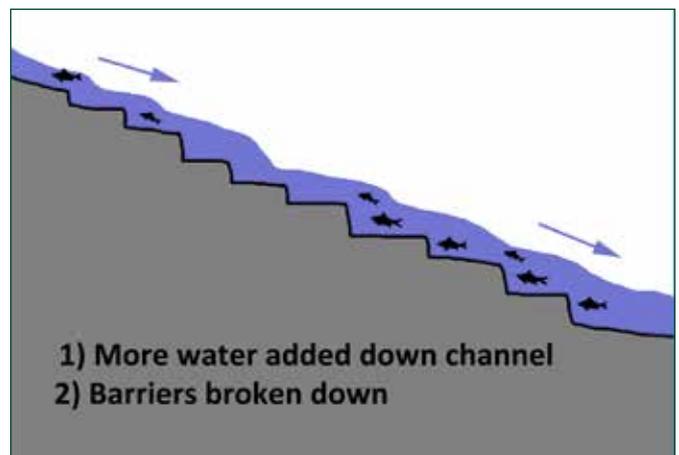
ILLUSTRATION: KENT HORTLE

2009 and 2015 as well as an environmental impact assessment in 2013, Don Sahong Power Company is undertaking activities to mitigate and monitor impacts, especially in the field of fish passage. The company is also supporting Lao government agencies to implement the Fisheries Law of 1999



Dry season passage is most obstructed

ILLUSTRATION: KENT HORTLE



Basic approach to mitigation

ILLUSTRATION: KENT HORTLE



Fishermen working on channels

PHOTO: KENT HORTLE

Mitigation approach

The main approach for improving fish passage at Khone Falls is to physically improve alternative channels by one or a combination of measures – deepening upstream entrances of channels to increase water flow; removing or flattening bedrock outcrops and boulders which obstruct fish passage; and deepening seasonal channels to provide bypass around barriers. Most of this work is done by fishermen using hand tools, who remove illegal gears at the same time to clear channels. Earthmoving machinery is also used for larger works such as the largest bypass passage for fish (Hou Wai) that opened on the Xang Pheuak Channel in April, 2016. As of November, 2016, fish passage works had been implemented at seven sites in the Khone Falls channels and more are planned over the next 10 years.

As well as physical improvements, local Lao

government agencies are working with villagers to implement the provisions of the Fisheries Law, including in 2016 removing gears which block fish migrations up the channels

Monitoring approach

Successful monitoring includes standard sampling in the channels, monitoring daily catches of 60 households and trapping and video recording of migrating fish. At a trial on Sadam Channel in early 2015, migrations were video-recorded so that fish species could be identified and counted. Video monitoring is feasible when the water is clear in the dry season from January to April. Videos showed that migration timing was consistent with previous reports. In the Sadam Channel trial, about 587,000 fish migrated over eight days in January 2016 with about three quarters caught by villagers and the rest successfully passing upstream, confirming that fishing pressure in this



Earthmoving machinery for larger works

PHOTO: KENT HORTLE



Newly opened bypass fish passage at the Xang Pheuak Channel on 26 April, 2016

PHOTO: KENT HORTLE

channel is the main factor preventing migration upstream during the dry season. Following removal of illegal gears in 2016, large catches occurred upstream of the Khone Falls during the wet season migration, confirming that many fish migrated through Khone Falls via alternative channels after Sahong Channel was closed.

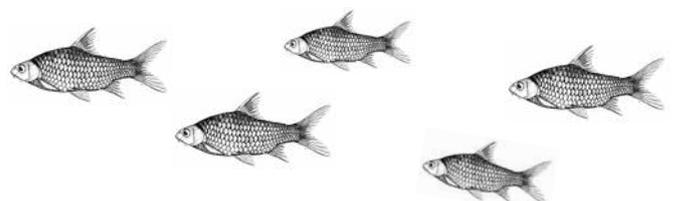
'Mitigation includes adding more water down a channel, reducing the height of barriers and creating bypass channels'

Lessons learned in recent years have highlighted the value of baseline surveys and monitoring including household monitoring which is very useful. Various kinds of data are needed and quality is important. Reducing fish pressure for successful fish passage highlights the need to work with and employ local fishers, identify

alternative livelihoods and enforce laws. Habitat management is needed as well to improve productivity regionally. Natural channels can provide fish passage, and more detailed work is needed on hydrology and hydraulics to optimise their parameters.

* <http://www.mrcmekong.org/topics/pnpca-prior-consultation/don-sahong-hydropower-project/>

The article above is based on a paper by Kent Hortle and Somphone Phommanivong presented to the Lower Mekong Fish Passage Conference in Vientiane on 17 November. Mr Hortle is advisor to Don Sahong Power Company and Mr Somphone is leader of the company's fisheries team.



Combating severe acute malnutrition in vulnerable communities

BY KIEV PHARIN AND ARNAUD LAILLOU *

In the slums of Cambodia’s capital city of Phnom Penh, many children are fed watered-down rice as their only source of solid nutrition. To help combat severe acute malnutrition in these vulnerable communities, UNICEF and partners developed a nutritious yet palate-pleasing fish snack for Cambodian children who are being treated with therapeutic feeding.

Yin Seiha is 15 months old. She lives with her mother Chea Sok in one of Phnom Penh’s slum communities, in a single room hut that floats on the Tonle Sap River. Smiling and playing with her one-year-old neighbour, it’s hard to believe that this is the same child that a month ago was struggling to live and in need of urgent treatment.

Luckily, the young child caught the attention of a local village health volunteer Sothea Teth, whose role is to identify malnourished children in the community and refer them to services. She also follows up with women and children who are at risk of becoming malnourished and could benefit from available support.

Sothea urged Chea to take her daughter to be checked by the nearby health centre staff during a nutrition screening session conducted by the Ministry of Health, with UNICEF support. The baby had been frequently sick, suffering from fevers and regular diarrhoea. “As the volunteer, I know many families with malnourished children,” Sothea said. “Visiting families at their home enables me to refer them to outreach services when they are offered at the village or to services at the health centre and



Fifteen-month-old Seiha sits in her mother Sok Chea's lap. Seiha is recovering from severe acute malnutrition after undergoing a treatment regimen using ready-to-use therapeutic food in the form of nutritional wafers.

PHOTO: © UNICEF CAMBODIA/2016/KIEV

hospital.”

At the screening site, Seiha was diagnosed with severe acute malnutrition by the trained health staff, requiring special treatment. They suspected that her inadequate diet – watered-down rice as her only source of solid nutrition – was the reason behind her poor nutritional status, as is the case with many other young children from poor families who live in similar conditions.

Nutrition-packed fish snacks

Like many poor Cambodians, Chea was simply unaware of her baby’s nutritional needs and what she needed to thrive. She did not realize that the food she was giving Seiha was preventing her growth and development and threatening her life.

After Seiha was diagnosed with severe acute malnutrition, the visiting health staff told Chea to take the baby to the National Pediatric Hospital in Phnom Penh for treatment. There, she was given take-home rations of a therapeutic food developed and tested by UNICEF and Institut de recherche pour le développement (IRD): a wafer called num Trey (fish snack in Khmer).

This snack was designed to suit the Cambodian diet to increase families’ receptiveness and continuation of the treatment. Children who are given num Trey are seen monthly by hospital staff to monitor their development and progress. The final results from the ongoing study of the impact of this new therapeutic food product are expected to be available by the end of this year.

Seiha is among the 206 children who have been treated or are under treatment for severe acute malnutrition at the National Pediatric Hospital of Phnom Penh during the first three quarters of 2016.

A healthier future

Chea is already pleased with the results. “Now my baby is much better and has gained some weight because of the num Trey from the hospital,” the happy mother said. “At the hospital, they also taught me the importance of coming back for three follow-up visits to monitor Seiha’s progress and receive more of these therapeutic snacks.”

Seiha enjoys eating the num Trey and has shown progress with each follow-up appointment. After the first visit, she could crawl for the first time. Two



Num Trey, therapeutic fish snacks with new packaging designed based on field tests. The wafers were developed to cater to Cambodian children’s taste preferences to increase families’ receptiveness and continuation of the therapeutic feeding treatment.

PHOTO: © UNICEF CAMBODIA/2016/KIEV

weeks later, she was able to move around and play with other children.

Chea is committed to completing the follow-up treatment because of these encouraging results. “I saw her getting better as she started to eat more,” she said. “I don’t want her to get sick again. I want her to get well. Seiha is now a healthy weight and her diet is much improved. I am very happy.”

With support from the National Committees for UNICEF in Australia, Canada, Hong Kong and Korea, targeted mass nutritional screening sessions were conducted in Phnom Penh three times during 2015 and twice so far in 2016, reaching more than 5,000 children each time.

These interventions coupled with other services have allowed more than 4,000 children to be treated in 2015, with even greater reach expected by the end of 2016.

Developing localized protocols and guidelines for the treatment of severe acute malnutrition is helping children complete their treatment and make a full recovery, with long-term positive impacts on their physical and cognitive development.

Each child reached and treated brings Cambodia one step closer to eradicating the harmful effects of severe acute malnutrition and creating a healthier future for all.

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WWF says Irrawaddy dolphins now ‘functionally extinct’ in Lao PDR

Small population of three individuals considered no longer viable

The population of critically endangered Irrawaddy dolphins (*Orcaella brevirostris*) in the Cheuteal trans-boundary pool between southern Lao PDR and northern Cambodia has shrunk by 50 percent this year alone and the population is functionally extinct in Laos, according to the World Wildlife Fund for Nature (WWF). In a statement released on October 26, WWF said Lao and Cambodian survey teams had conducted a dolphin abundance survey and confirmed the number and breeding status of the dolphins in the transboundary pool. The number was down to three individuals, from six earlier this year. “There is now little hope for a reversal of the situation, as the small population is no longer viable,” it said.

The statement said that “functional extinction” resulted when there were too few potential breeding pairs available to ensure the survival of the population. “The use of gill nets — especially unmanned gill nets — is thought to be one of the main reasons for the demise of the dolphins,” it said. “Gill nets are vertical panels of netting set in a straight line across a river to catch fish. Being large aquatic mammals, Mekong River dolphins — as well as other endangered aquatic species — are often caught in gill nets, and drown as a consequence.”

WWF noted that the use of gill nets in the Mekong River was prohibited in Cambodia — where there are an estimated 80 dolphins — but not in Lao PDR. “Only the actual deep pool off Hangsadam Village, where the dolphins are, is protected,” it said. “Gill nets are, however, used directly outside of the pool where the dolphins often swim and risk being trapped.” It called for an immediate ban on all gill nets for a two-kilometer radius around the Cheuteal Pool and increased enforcement against violators, with size of banned nets increasing to four kilometres during the wet season, “WWF also calls for increased enforcement of gillnet bans in other Mekong River dolphin pools to protect the



Irrawaddy dolphin (*Orcaella brevirostris*) at Koh Kon Sat, Mekong River, Cambodia. The dolphins were photographed during dolphin population research conducted by WWF Cambodia's Mekong Dolphin Conservation Project in November 2007.

PHOTO: FERNANDO TRUJILLO / WWF GREATER MEKONG

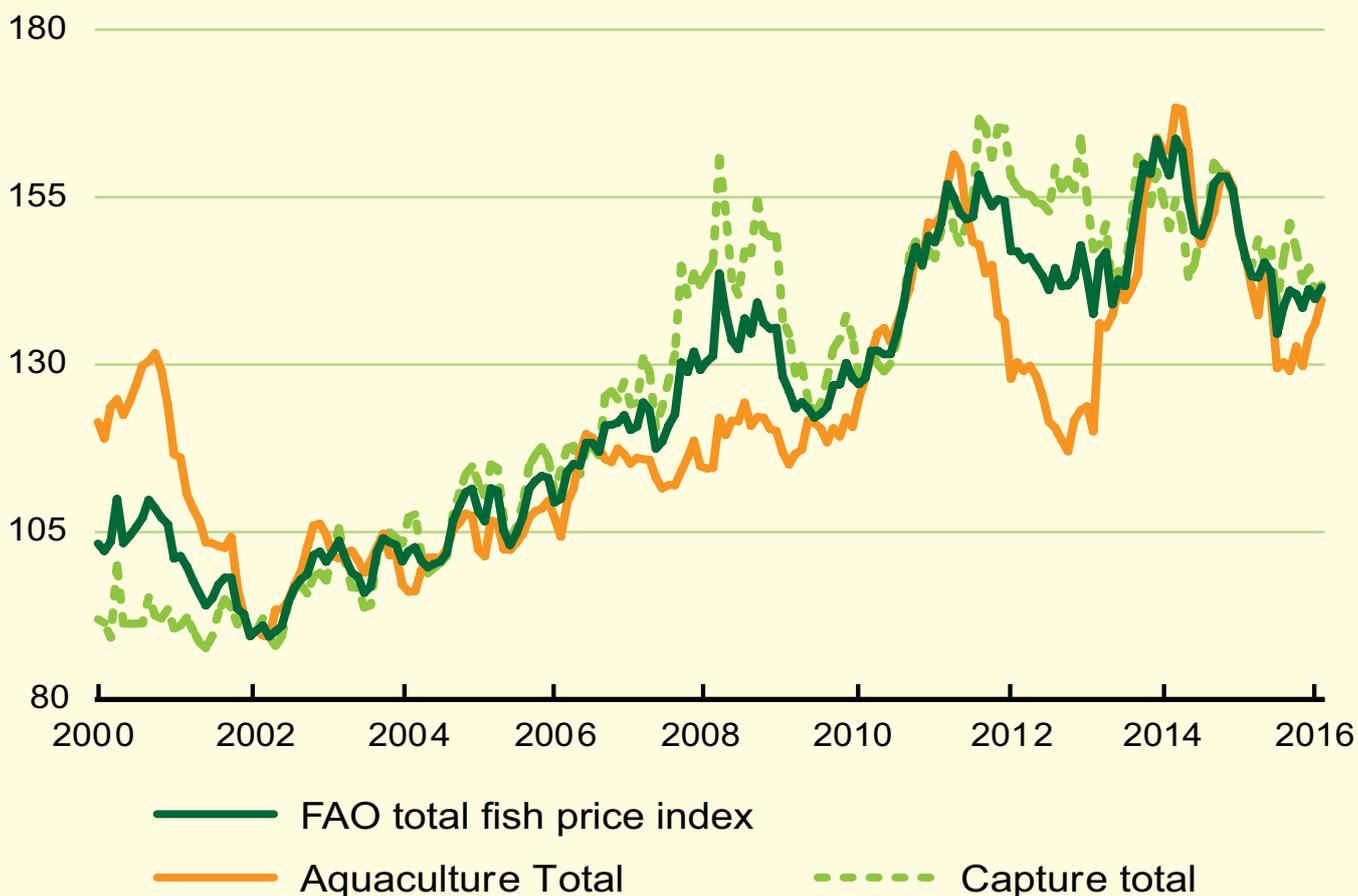
remaining dolphin populations,” the statement said.

Teak Seng, the WWF conservation director for the Greater Mekong, said the “alarming” decline of Irrawaddy dolphins in Lao PDR this year was a “tragic” development. “We fear that in a year or two, there may be no more dolphins in Laos,” he said “The loss of this iconic species for Laos is even more tragic given that it was entirely preventable through strict enforcement against gill net fishing.”

WWF noted that the dolphins had long been a “favourite attraction” among travellers and tourists in southern Lao PDR. “Their feared disappearance from Lao waters may cause a hard blow to eco-tourism in the area,” the statement said.

While Irrawaddy dolphins are found in some coastal areas in Asia, here are only three freshwater subpopulations — in the Ayeyarwady River in Myanmar, the Mahakam River in Indonesia, and the Mekong River in Cambodia and Lao PDR.

FAO Fish Price Index
Norwegian Seafood Council (2002-2004 = 100)



Production, trade, utilisation and consumption FAO Food Outlook, June 2016	2014	2015 Estimate	2016 Forecast	Change 2016/2015
	Million tonnes			%
Production	167.2	171.0	175.0	2.3
Capture fisheries	93.4	93.5	93.6	0.1
Aquaculture	73.8	77.5	81.4	5.0
Trade value (exports USD billion)	148.1	134.1	132.6	-1.1
Trade volume (live weight)	60.0	59.9	59.9	0.0
Total utilization	167.2	171.0	175.0	2.3
Food	146.3	149.4	153.6	2.8
Feed	15.8	16.5	16.3	-1.2
Other uses	5.1	5.1	5.1	0.0
Consumption per person				
Food fish (kg/yr)	20.1	20.3	20.6	1.7
From capture fisheries (kg/year)	10.0	9.8	9.7	-0.7
From aquaculture (kg/year)	10.1	10.5	10.9	3.9
FAO Fish Price Index (2002-2004 = 100)	2014	2015	2016	Change
	156	142	Jan-Feb 141	Jan-Feb 2016/Jan-Feb 2015 -5.0



His Majesty Bhumibol Adulyadej, the King of Thailand, died on October 13, 2016, at the age of 88. The world's longest reigning monarch left behind a legacy of fisheries and related projects across Thailand spanning more than six decades. The photo above shows His Majesty releasing indigenous fishes, including Mekong giant catfish, bagrid catfish and sheatfish, at the Royal-initiated Kum River Basin Development Study Centre in Sakhon Nakhon Province. 23 November, 1992. The Kum River is a tributary of the Mekong (see photographic essay on page 4).



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