

Summary of CPWF Research in the Mekong River Basin

October 2013



CPWF Mekong seeks to reduce poverty
and foster development by optimizing
the use of water in reservoirs

About the Mekong River Basin

- **Length:** Approximately 4,350 km long; headwaters in the Tibetan Plateau of the Himalayas; flows through three provinces of China then through Myanmar, Lao PDR, Thailand, Cambodia and Viet Nam to the South China Sea.
- **Catchment area:** Approximately 795,000 km² (roughly the size of Pakistan).
- **Population:** Approximately 70 million; 95 ethnic groups.
- **Biodiversity Index:** High (second only to the Amazon); an estimated 800+ species of fish. Fisheries of the Mekong are estimated to be worth over \$US2 billion per year. Aquatic resources such as fish and molluscs account for 80% of the protein in household diets.
- **Economy:** Largely agrarian but rapidly shifting to manufacturing and service industries. The major challenges: reducing poverty and balancing economic growth with environmental sustainability.

Hydropower development: a defining issue

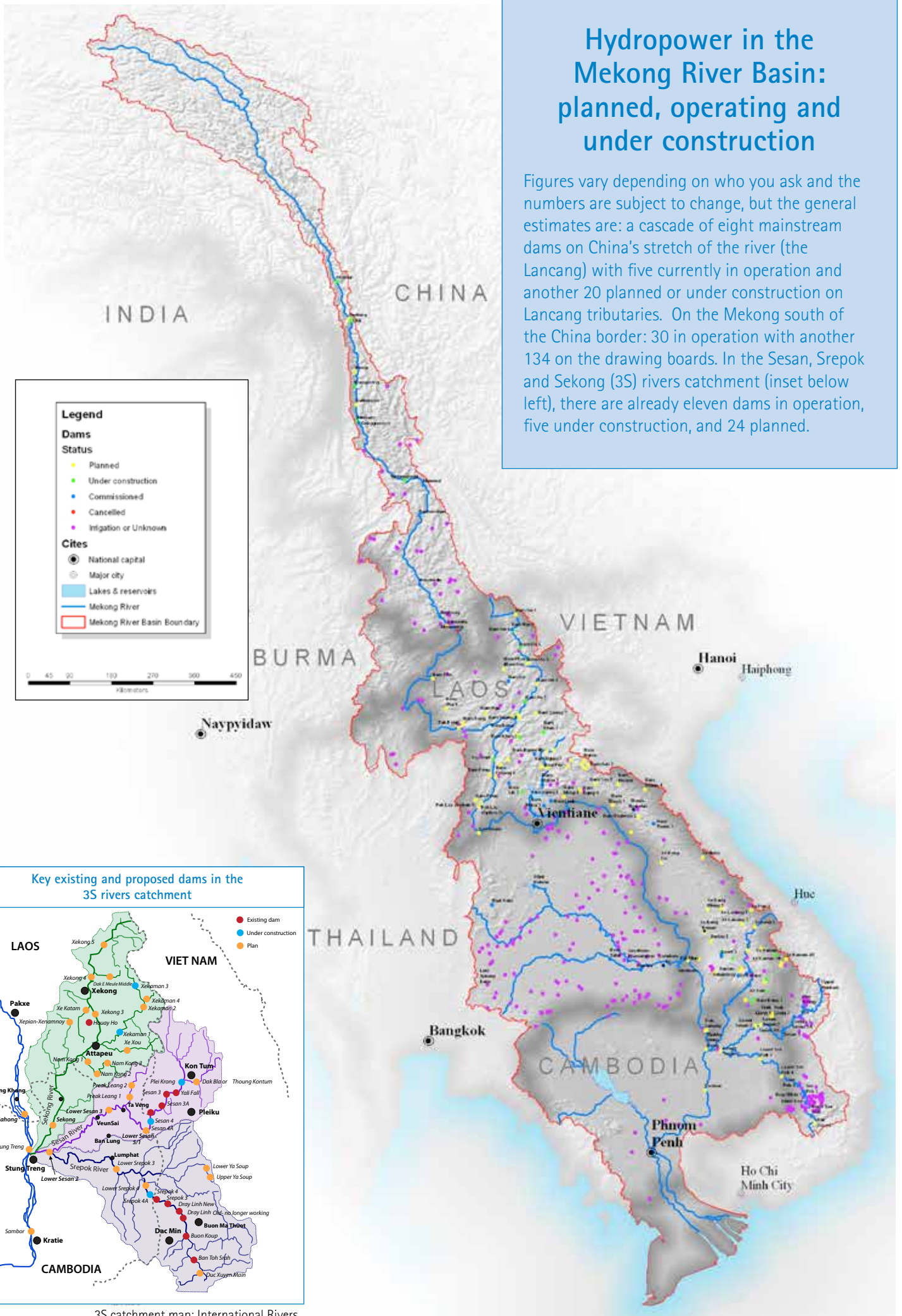
There are few other places in the world, perhaps none, with such intensive dams development as the Mekong Basin.

The major tensions in the Mekong revolve around dams and other infrastructure development and the shift from economies based on agriculture and primary production to manufacturing, industry and services.

The main protagonists in this debate are governments, dam financiers, developers and operators, NGOs and civil society. Within each group there are multiple, often conflicting, perspectives. Much of the debate revolves around costs and benefits and issues of governance and transparency.

Hydropower in the Mekong River Basin: planned, operating and under construction

Figures vary depending on who you ask and the numbers are subject to change, but the general estimates are: a cascade of eight mainstream dams on China's stretch of the river (the Lancang) with five currently in operation and another 20 planned or under construction on Lancang tributaries. On the Mekong south of the China border: 30 in operation with another 134 on the drawing boards. In the Sesan, Srepok and Sekong (3S) rivers catchment (inset below left), there are already eleven dams in operation, five under construction, and 24 planned.



Measures of success

CPWF's goals in the Mekong sought to ensure that reservoirs would be:

1. Managed in ways that are fairer and more equitable to all water users.
2. Managed and coordinated across cascades to optimize benefits for all.
3. Planned and managed to account for environmental and social needs.
4. Used for multiple purposes besides hydropower alone.
5. Better governed and the benefits better shared.

During Phase 1 (2004-2009), CPWF-Mekong managed 13 projects in the basin. During Phase 2 (2010-2013), CPWF Mekong implemented:

- 19 projects, through a network of 76 partners, with US\$10.7 million.
- 22 small grants in Vietnam, Lao PDR and Cambodia, China and Thailand.
- A scaled approach: local, catchment and basin.
- A robust and evolving research-for-development approach.
- Three regional Mekong Forums on Water, Food and Energy, and hundreds of workshops.
- A wide variety of impact pathways that saw changes in the ways dams were managed and monitored.

Messages

Transparency is a critical ingredient in hydropower planning. Protocols and safeguards are vital to implementing and monitoring dams.

There are plenty of protocols and safeguards for Mekong dams written into national policy and legislation. The World Commission on Dams offered guidelines, as does the International Hydropower Association in their hydropower sustainability protocol. Several CPWF Mekong projects directly address transparency and governance by promoting dialogue among and between government ministries and departments, dam operators and civil society.



Photo: Paolo Campo

Bridging the Hydropower Policy-Implementation Gap

One CPWF Mekong project is working to bridge the policy-implementation gap by creating new communications and feedback mechanisms to improve participation in decision making for local land and water use. Participating partners in the project are:

- Faculty from the Environmental Sciences Department at the National University of Laos,
- Government officials from the Lao Ministry of Energy and Mines and the Ministry of Natural Resources and Environment,
- Village Focus International, Land and Livelihoods Program, and
- The Public Relations Office of the Prime Minister's Office.

The team is working at two dam sites: the Nam Lik 1 hydropower project in Hin Huep District in Vientiane Province, and the Nam Ou 2 cascade in Gnoy District in Luang Prabang Province.

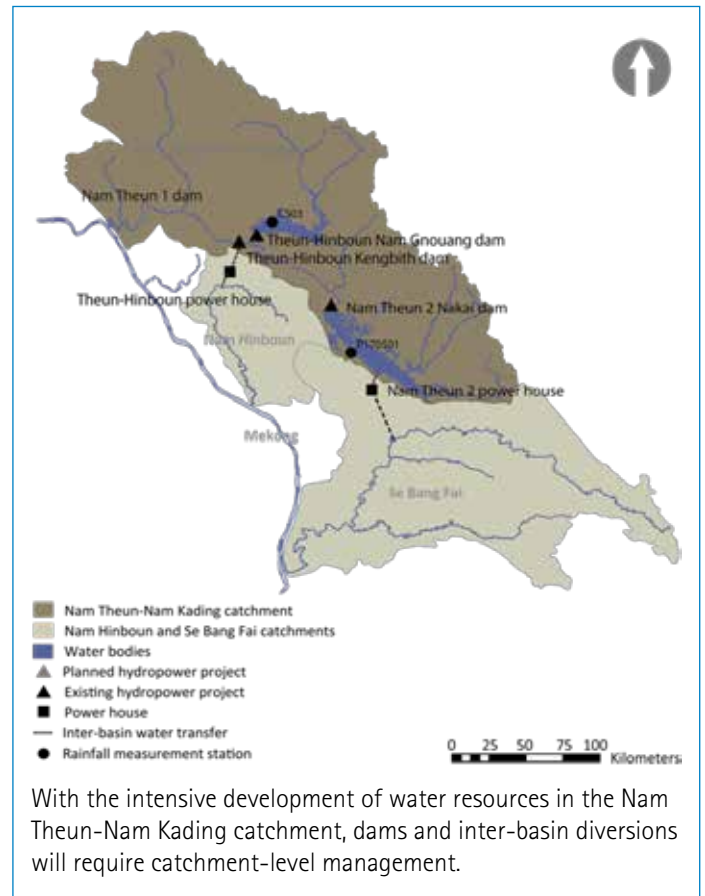
Using participatory rural appraisal, the team conducted consultations at the national, district and community level and identified gaps in information, coordination, compensation and resettlement. Solutions mainly took the form of communication tools and feedback mechanisms.

Because government officials and civil society worked on solutions together, the outcomes are both practical and sustainable.

The cumulative impact of dams will become an increasingly important issue. Hydropower development must be coordinated across cascades and political boundaries.

As hydropower development progresses, it will no longer be enough to address the impacts of a single dam in a localized area. A recent CPWF study on flood control challenges for large hydroelectric reservoirs showed that reservoirs in tropical climates present more challenging conditions for flood control than faced by dam operators in temperate climates.

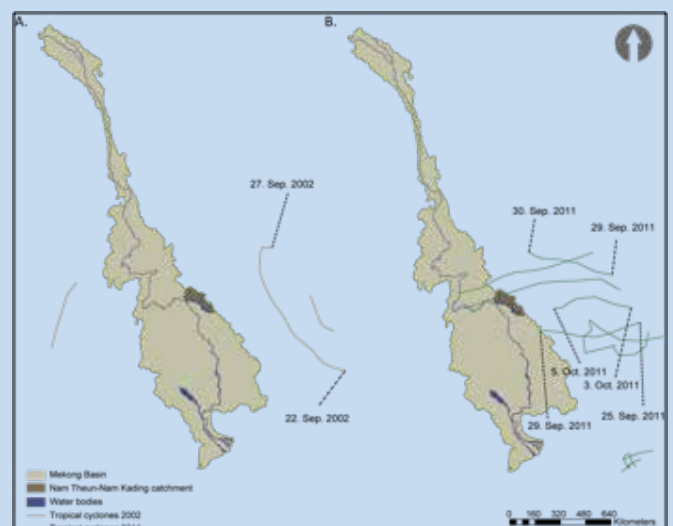
Using modeling tools, researchers illustrated how in the Nam Theun 2 reservoir a combination of mechanical failure and human/management error could result in water level conditions that would constitute an extreme hazard. In a contrasting scenario, the timely opening of spillway gates, combined with capability to release water from all gates at full capacity, allowed for reservoir levels to stay well within the safe range and allowed for a significant reduction in downstream flood discharge. Such research suggests the growing need for attention to management of cumulative impacts and an emerging role for river basin committees for emergency communications capability between dam operators and downstream stakeholders.



Extreme Weather Events Upstream can have Severe Impacts on Downstream Dams

This figure shows typhoon tracks for the years 2002 (A) and 2011 (B), with the Nam Theun-Nam Kading catchment shown on the east of the basin. The cyclones which occurred approximately during the September 2002 and October 2011 floods are marked with dates. Note that these tracks are for the centers of the typhoons only, and bely the huge areal extent of the atmospheric events. Only cyclone tracks which are within 500 km distance from the Mekong Basin are shown.

Recent flood history suggests that the Nam Theun-Nam Kading catchment is prone to significant flood events with a recurrence interval of six to nine years. A general feature of the 1996, 2002 and 2011 flood events is that they occurred late in the wet season around late September–October, coinciding with a period of intense tropical cyclone activity. Passage of smaller events such as tropical storms can cause extremely serious flooding if they stall for periods of time over the basin.



From: Flood Control Challenges for Large Hydroelectric Reservoirs, with Examples from Nam Theun-Nam Kading Basin in Lao PDR. Peter R.B. Ward, Timo A. Räsänen, P.J. Meynell, and T. Ketelsen

Constructed Wetlands around Reservoirs

Wetlands are essential to the livelihoods of poor people throughout the world and the Mekong is no exception. They are also central to the ecological productivity of riverine systems. Hydropower dams radically alter the local hydrology and often diminish the extent of existing wetlands thereby jeopardizing the livelihoods of the rural poor. A CPWF research paper conceptualizes creating wetlands in reservoirs that have a large drawdown zone. Such reservoirs often have relatively limited diversity of aquatic habitats and their productivity is limited by the rather barren shoreline areas in the drawdown. The team proposed developing permanent wetlands within the drawdown area through the construction of small dykes below the full supply level that would retain water as the water level falls and be recharged with water during the wet season filling of the reservoir. Such created wetlands would contribute to greater habitat diversity and allow areas for fish spawning and growth and hence increase the productivity of the reservoir and could also be used as more conventional fishponds for enhancing livelihood opportunities.

A field trip was organized as a collaboration between the Theun Hinboun Power Company (THPC), a major supplier of hydroelectric power in Lao PDR, and two CPWF projects to carry out an initial survey of the possible locations where wetlands might be constructed. After the trip, surveyors and irrigation engineers from THPC developed designs for the dykes and spillways at five of the locations, together with cost estimates that have proven to be extremely useful.

There are numerous agricultural and water-related technical applications that can contribute to livelihoods, recreation and environmental enhancement, thereby creating opportunities and increasing the benefits from hydropower development. The ecological productivity of reservoirs can be improved.

Rainwater harvesting, drip irrigation, conservation agriculture, farmer field schools. These and many other technologies are generally well known and known to work in many places under varied conditions. The barrier is always changing the way people think about using these technologies and involving the right partners. In the example to the left, the participation of the Theun Hinboun Power Company was a key factor.



Photo: Ian Taylor

Hydropower can be multi-purpose. Relatively simple strategies can result in more benefits to more people and the environment.

In the Mekong, one of the major concerns is how to mitigate the impact of dams on fish migrations. Most of the existing work on fish passes has been done in temperate climates on only a few species such as salmon. One CPWF Mekong project is breaking new ground in research on fish passes for large numbers of tropical species.

Safer Fish Passes

Researchers from the United States, Australia and Lao PDR have joined forces in a collaborative effort to improve safe fish passage through hydropower systems. This global collaboration involves replicating Sensorfish, barotrauma and shear stress work in Lao PDR and Australia to obtain data on other fish species. Researchers are initially focusing on assessing the critical levels of pressure change, fluid shear and blade strike which is likely highly depending on the size, age and weight of different fish species. Once the threshold values of each are determined, researchers then work with engineers to create hydro facilities that use this fish friendly design criteria. Full-scale pilot hydropower plants are then constructed and researchers perform real-life assessment of fish survival to ensure everything is performing to specification. It is an excellent example of adaptive management in practice. By expanding the knowledge of hydropower issues beyond salmon to other species, advances in technology can be used to have positive global impacts and provide confidence that expansion of hydropower production will be sustainable.

Research staff are now initiating work in Lao PDR and Australia to ensure design criteria based on local fish species is available in the near future for inclusion in new development projects. Work in the United States is also being expanded to other fish species such as lamprey and white sturgeon, in an effort to increase the understanding of impacts on species beyond salmon. Researchers are hopeful of engaging developers to construct the first research-based fish-friendly hydro plants within the next two years.



A Lao university researcher observing fish in a barotrauma chamber, where they will be subjected to a rapid pressure change similar to what they would experience as they pass downstream through a hydro turbine. Photo: Garry Thorncraft



Stakeholder platforms can influence decision-making.

The idea of integrated water resources management is relatively new in the Mekong, but has nevertheless appeared in water-related legislation. In Cambodia, this has prompted a national debate on what integrated water resources management means for Cambodia. One CPWF project has implemented an initiative that perceives multistakeholder platforms as a mechanism for integrating and managing water. Working in the Stung Pursat catchment in western Cambodia, the project has brought together provincial and district authorities, national ministries, national NGOs, and local community agencies to debate water management issues in this rapidly changing catchment and to identify solutions. The project aims to make this stakeholder platform approach a standard for integrated water resources management implementation across Cambodia.

At the program level, CPWF Mekong has created six stakeholder platforms. Through these, a variety of notable outcomes have emerged. In China, the concession holder for the Lancang, having learned of the International Hydropower Association's hydropower sustainability assessment protocol through CPWF, has decided to implement the protocol at two of its dams. Similarly, an independent power producer in Lao PDR that participated in CPWF's stakeholder platforms has engaged with CPWF-supported experiments to improve the livelihoods of resettled people through integrated rice and fish farming systems. In Vietnam, the Yali Falls dam has agreed to experiment with short duration millet varieties cultivated in the drawdown zone of its reservoir. Platforms are a basis for obtaining knowledge and new ideas, thereby yielding changes in behavior.

Sharing Lessons on Hydropower Development Processes and Stakeholder Engagement between Cambodia and Lao PDR

CPWF researchers have been working in three case study areas in Cambodia, Lao PDR, and Vietnam, including the proposed Lower Se San 2 Hydropower Dam in Stung Treng province in Cambodia. During consultation meetings, the provincial and local authorities expressed concerns about their lack of experience in dealing with hydropower companies and in managing resettlement and compensation processes. People in communities upstream and downstream of the dam site expressed concerns about how to deal with the dam's impacts, especially in terms of coping with changes to their livelihoods. Few of the affected citizens had actually seen a hydropower dam, reservoir, or a resettlement village, and did not really know what to expect.

At the Lao study site, the team observed and documented communities in the process of resettlement and struggling to re-establish their livelihoods in a new village. The team began to explore ways to facilitate exchanges between the stakeholders in Cambodia and their counterparts in Lao PDR through study tours.

Two of the project partners, a national NGO and a government ministry, organized an exchange of provincial and district authorities, NGO staff and community members from Stung Treng Province to the Theun-Hinboun Expansion hydropower project in Laos. The group visited the dam site and resettlement villages and met with company staff and Lao authorities involved in hydropower dam development.

As a result of the exchange, the participants from Stung Treng now have a much better knowledge of that will help them cope with the changes likely to result from new dams. Participants are able to talk more confidently about hydropower issues and are committed to sharing what they learned with their peers.

CPWF Mekong projects in Phase 2

Optimizing Water Supply Infrastructure Management for Livelihoods: A livelihoods project that aims to develop strategies for optimizing the benefits of water storage infrastructure and increasing the ways in which water can be used to support the livelihoods of communities around reservoirs and downstream. [MK1](#)

Water Valuation: Assessing the value of water in its various uses. [MK2](#)

Optimizing Cascades or Systems of Reservoirs in Small Catchments: Developing a systems approach to coordinated and equitable management of cascades of reservoirs through a suite of hydrological and hydraulic modeling to focus on multi-use, optimization and benefit sharing at the catchment level. [MK3](#)

Water Governance: Focuses on the governance structures and mechanisms needed to enable, support and maintain the successful Water Storage Infrastructure optimization strategies identified by the first three CPWF-Mekong projects. [MK4](#)

The Coordination and Change Project: Connects the analytical efforts of CPWF Mekong projects. [MK5](#)

Hydropower Governance and Multi-stakeholder Platforms: Developer and civil society dialogues and independent trials of the Hydropower Sustainability Assessment Protocol in the Mekong Region. [MK6](#)

The M-POWER-CPWF Research Fellowships Program: Provided funding to improve the capacity of 53 Fellows to critically analyze water resources management and development, and the challenges for democratizing water governance in the region. [MK7](#)



Improving Mekong Dam Dialogues: A Participatory Assessment of the Impact of Dams on the Livelihoods of the Mekong: Improving dialogue on community-level experiences of change to the Mekong's water resources, using 'Thaibaan' research and participatory video. [MK9](#)

Improving Hydropower Decision-Making Processes in the Mekong: Focuses on understanding and improving the ways in which decisions are made with respect to hydropower (HP) location, coordination, development and operation in the Mekong River Basin. [MK8](#)



Knowledge and Institutional Systems in the Management and Coordination of Hydropower Social Safeguards; Hydropower Development in Attapeu Province, Lao PDR: Combines research, workshops and the development of a manual about the International Hydropower Association's hydropower sustainability assessment protocol, and about Lao and international guidelines, to assist in the coordination of knowledge and good practice in hydropower social safeguards. [MK10](#)



Bridging the Hydropower Policy–Implementation Gap; Communications and Feedback Mechanisms to Improve Participation in Decision–Making for Local Land and Water Use: To improve the application of Lao policy in two hydropower development projects. [MK11](#)

Balancing the Scales; Gender Justice in Hydropower: Explores three sets of standards, guidelines and safeguard measures to evaluate their attention to gender (national standards, policy and legislation; regional standards, policy and guidelines; and international standards, policies and guidelines). [MK13](#)

The Impact of Water Supply Infrastructure (WSI) on Floods and Drought in the Mekong Region and Implications for Food Production: To enhance the contribution of WSI to security in the Mekong region by documenting the effects of WSI on the flood and drought regime; documenting the food security implications of WSI impacts and defining WSI designs and management approaches to enhance WSI contributions to food security. [MK12](#)

Potential for Increasing the Role of Renewables in Mekong Power Supply: To promote the deployment of more sustainable and equitable renewable energy generation technologies as an alternative to medium and large-scale hydropower. [MK14](#)

Fostering Evidence–based IWRM in the Stung Pursat Catchment (Tonle Sap Great Lake), Cambodia: Examines three underlying water management problems: lack of cross–sectoral collaboration; lack of data or scientific analyses; and lack of institutional mechanisms by which inter–sectoral management can occur or for interpreting and using existing or new scientific data. [MK16](#)

Optimizing Fish–friendly Criteria into the Design of Mini–hydro Schemes in the Lower Mekong Basin: Conducts preliminary work to determine the engineering design criteria needed to allow fish to migrate past instream barriers with minimal injury or mortality. [MK15](#)

Fisheries and Aquaculture Production in Reservoirs in Lao PDR: The project will provide better information on reservoir fisheries and aquaculture so that reservoirs will be planned and managed to provide a broader range of benefits, particularly to rural people living nearby. [MK19](#)



The Impact of reservoirs on water resources and socio–economy: A comprehensive study of the Srepok River (Viet Nam): Considers the impact of changes on the flows of the Srepok River drawing on baselines provided by previous studies. Implements a water audit for the catchment and considers ways in which variations in water flow impact various demands; forecasts water demands needed to secure the sustainable use of water for livelihoods, economy and the environment in the Srepok catchment. [MK17](#)

Experimenting with a Bottom–up Multi–stakeholder Platform Supported by Modeling Games in the Nam Theun–Nam Kading Catchment: Experiments with scaling–up past use of the ComMod approach, from the catchment scale to the sub–basin scale of a Mekong tributary in the Nam Theun–Nam Kading. [MK18](#)

Selected outcomes

Hydropower at the scale and scope of development in the Mekong is unprecedented and there is much yet to be learned. Four years is a too short a period to expect major outcomes in terms of changes in knowledge, attitudes and skills. Progress towards long-term goals can best be measured in small steps. The outcomes shown here are just some of the small steps indicating that change is taking place.



Photo: Ian Taylor

Reservoirs will be managed in ways that are fairer and more equitable to all water users.

- Livelihoods improvement strategies and technologies trialed at Theun-Hinboun Power Company and Yali Falls; dam operators fully supported the research (MK1).
- Helping Vietnamese dam operators in Lao PDR address gender and indigenous community aspects of implementation.
- Developing gender standards and safeguards in the hydropower sector with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) (MK13).
- Bringing national legislation to local levels.
- An interactive computer-based game on basin management.
- Villagers trained to conduct research to catalog and value their resources.

Reservoirs will be managed and coordinated across cascades to optimize benefits for all.

- Sustainable hydropower curricula development with Ubon Ratchathani University in Thailand.
- A new catchment strategy for the Nam Theun-Nam Kading River Basin Committee.

Reservoirs will be planned and managed to account for environmental and social needs.

- Hydropower Sustainability Assessment Protocol trailing at two major Chinese dams.
- Artificial wetlands construction in partnership with IWMI and Theun-Hinboun Power Company.

Reservoirs will be used for multiple purposes.

- Reservoir fisheries may be more productive than the dominant narratives suggest.
- Drawdown zone agricultural solutions at Yali Falls.
- Multiple uses for small-scale irrigation weirs and groundbreaking research on fish ladders.

Reservoirs will be better governed and the benefits better shared.

- Providing informal fora for China to engage south of the border.
- An emerging IWRM multi-stakeholder platform in Cambodia.
- CPWF dialogues and forums have created a new way to discuss hydropower and associated research.

Lessons learned

Sensitive and controversial topics can be addressed

When CPWF proposed making a documentary film on hydropower development in the Mekong, they said it couldn't be done. Some people were skeptical and others outright against the idea. Produced by an independent film maker and funded by Sida, CPWF and IUCN, the 52 minute documentary *MEKONG* features stories of Mekong citizens up and down the river, from fishers on the Tonle Sap, activists still fighting at the Pak Mun dam in Thailand, to a vice minister from Lao PDR convinced he can build the region's most 'river-transparent' dam. Filmed in four countries and four languages, it includes footage of China's Mekong [Lancang] dams, as well as on-site footage of the controversial Xayaburi dam in Lao PDR. Thanks to a partnership with the Goethe-Institut, *MEKONG* reached an audience of nearly half a million viewers in 12 countries and was widely acclaimed as a balanced presentation of the issues.

Getting from research to action takes time

Hydropower development in the Mekong is taking place at a scale and pace seldom seen elsewhere in the world. CPWF's first phase (four years) was, in retrospect, a learning phase from which emerged a clear definition of the basin challenge. The second phase (4 years) focused on engaging with decision-makers to promote dialog aimed at improving governance and transparency. The planned third phase (third years) would have carried this body of work forward towards greater engagement with the various actors and potentially some visible progress towards the five measures of success. Another decade will be needed to see measurable results.

Engagement : the secret ingredient

Engagement takes many forms and is often a time consuming and 'messy' process. The outcomes are generally a higher level of trust among the parties involved and longer lasting more sustainable solutions than those imposed from above.

It takes time to build trust

Decision makers are sensitive to many competing interests and subject to influence from many quarters. They are inundated with research reports that vary widely in relevance and quality. To become a trusted source requires a long-term investment in building relationships and 'convening power', which is the power to bring together diverse interests in open debate aimed at generating solutions.



Photo: Ian Taylor



CPWF Mekong projects are lead by:

MK1: International Water Management Institute

MK2: The World Fish Centre

MK3: The International Centre for Environmental Management

MK4: The Asian Institute of Technology on behalf of the Mekong Program on Water, Environment and Resilience

MK5: The CGIAR Challenge Program on Water and Food

MK6: The Mekong Program on Water, Environment and Resilience

MK7: The Asian Institute of Technology on behalf of the Mekong Program on Water, Environment and Resilience

MK8: The D Foundation for Doing Good Work

MK9: The Participatory Development Training Center on behalf of the Lao Water Resources Network

MK10: The National University of Laos

MK11: Village Focus International

MK12: The International Centre for Environmental Management

MK13: Oxfam Australia

MK14: The International Centre for Environmental Management

MK15: The National University of Laos

MK16: Hatfield Consultants

MK17: Institute of Water Resources Planning

MK18: Chiang Mai University

MK19: Mekong Development Centre

Partners:

An Giang University **Asian Institute of Technology** AusAID **Cambodian Consulting Development Engineering** Cambodian Institute of Technology **Center for Development Oriented Research in Agriculture and Livelihood Systems** Center for Southeast Asian Studies, Kyoto University **Center for Sustainable Development of Water Resources and Adaptation to Climate Change** Center for Water Resources Conservation and Development **Central Institute for Economic Research and Management, Ministry of Planning and Investment** Centre de Coopération Internationale en Recherche Agronomique pour le Développement **Chiang Mai University** Culture and Environment Preservation Association **D Foundation for Doing Good Work** Department of Agricultural Extension, Ministry of Agriculture, Forestry and Fisheries **Department of Environmental Science, Royal University of Phnom Penh** Department of Livestock and Fisheries, Ministry of Agriculture, Forestry and Fisheries **East Forum Cooperation Centre** Electricité du Laos **Energy Research Institute** Enterprise Development Institute **Faculty of Engineering, National University of Laos** Faculty of Political Science, Chulalongkorn University **Faculty of Social Sciences, National University of Laos** Gender Development Group **GMS Study Center, Yunnan University** GreenID **Hatfield Consultants** Institute of Water Resources Planning, Ministry of Agriculture and Rural Development **International Center for Environmental Management** International Food Policy Research Institute **International Water Management Institute** Lao Institute for Renewable Energy **Lao Water Resources Network** Living Aquatic Resources Research Centre, Ministry of Agriculture, Forestry and Fisheries **Mekong Development Centre** Mekong Program on Water, Food and Resilience **Mekong Sub-Region Social Research Center, Ubon Ratchathani University** Ministry of Energy and Mines **Ministry of Industry and Trade** Ministry of Industry, Mines and Energy **Ministry of Natural Resources and Environment** Ministry of Water Resources and Meteorology **Nam Theun – Nam Kading River Basin Committee Secretariat** National Agriculture and Forestry Research Institute, Ministry of Agriculture, Forestry and Fisheries **National Research Center for Resettlement, Hohai University** National University of Laos **NGO Forum on Cambodia** Oxfam Australia **Palang Thai** PanNature **Participatory Development Training Center** School of International Studies, Peking University **Soils and Fertility Research Institute, Ministry of Agriculture and Rural Development** Supreme National Economic Council **Tonle Sap Authority** Ministry of Water Resources and Meteorology **Vietnam National Academy of Science and Technology** Vietnam University of Science **Village Focus International** Waratah Power **Water and Development Research Group, Aalto University** Western Highlands Agro-Forestry Scientific & Technical Institute **WorldFish**

About CPWF

The CGIAR Challenge Program on Water and Food was launched in 2002. The CPWF aims to increase the resilience of social and ecological systems through better water management for food production (crops, fisheries and livestock). We do this through an innovative research and development approach that brings together a broad range of scientists, development specialists, policy makers and communities, in six river basins, to address the challenges of food security, poverty and water scarcity.

The CPWF is part of the CGIAR Research Program on Water, Land and Ecosystems. WLE combines the resources of 11 CGIAR centers and numerous international, regional and national partners to provide an integrated approach to natural resource management research. The program goal is to reduce poverty and improve food security through the development of agriculture within nature. This program is led by the International Water Management Institute (IWMI).

For more information, contact:

CPWF Mekong

Naga House

House 87, Unit 7, Mixay Village

Chantabouly District

Vientiane Capital, Lao PDR

Email: cpwf.mekong@gmail.com

Web: <http://mekong.waterandfood.org>

CGIAR Challenge Program on Water and Food

Email: cpwfsecretariat@cgiar.org

Web: www.waterandfood.org



**CGIAR Challenge Program on
WATER & FOOD**

Andes • Ganges • Limpopo • Mekong • Nile • Volta



A partner of the



**RESEARCH
PROGRAM ON
Water, Land and
Ecosystems**