CGIAR Challenge Program on WATER & FOOD

Submission Document – Mekong Project 2

On water valuation

Basin Development Challenges of the CPWF

To reduce poverty and foster development through management of water for multiple uses in large and small reservoirs

July 2009

1. Basin Development Challenge:

Mekong: To reduce poverty and foster development through management of water for multiple uses in large and small reservoirs[i]

2. Project:

Project 2: On water valuation

3. Project Data

Duration:	*32 months*
Target start date:	*01 July 2010*
Finish date:	*28 Feb 2013*
Maximum budget requested from CPWF:	*USD 600 K*

4. Project Deliverable

- Assessment of who uses reservoir waters, for what and with what costs and benefits, including considering environmental flows

5. BDC Goals to which the Project will contribute

New storage infrastructure (WSI) are being built in various tributaries of the Mekong, including (but not restricted to) the common border area between Lao PDR, Cambodia and Vietnam. If this BDC is successfully addressed, these reservoirs will be managed in ways that are more fair and equitable for all water users. WSI management will take account of fisheries and agricultural potential as well as hydropower generation, and riparian communities will be able to utilize these water sources for multiple purposes. Catchments will be managed in ways that reduce erosion and the siltation of WSI, while benefiting riparian communities by opening up farming and other opportunities. Of importance will be the ability to manage WSI sequentially, along the length of rivers, so as to optimize benefits for all. In order to achieve this, water governance – the capacity to negotiate amongst water users (including dam operators) – must be improved, paving the way for policy and administrative changes that enable the sharing of benefits among riparian communities, among water users and between nations.

6. Links with other projects in the Basin Development Challenge[ii]**:**

The project will need to work with other projects in the BDC to contribute to a coherent research program that is lead by a Basin Leader.

7. Project Summary

This project is about assessing the value of water in its various uses. It sets out to estimate the costs and benefits of different uses of WSI water at reservoir and catchment levels. It includes an assessment of water needs for major water uses (agriculture, fisheries, ecosystem, and⁄ or hydropower) and features the application of quantitative and qualitative valuation techniques to estimate costs and benefits associated with different water management strategies and scenarios.

Water valuation means expressing the value of water-related goods and services so as to inform sharing and allocation decisions. It covers both use and non-use values, extractive and in situ use values, and consumptive and non-consumptive use values. It features quantitative and qualitative approaches and considers relationships between interconnected and interdependent water uses. Project outputs will take the form of valuation estimates that reflect the distribution of costs and benefits: across uses and users (considering gender differentiation), across scales (in the reservoir and across the catchment area considering other WSI).

Valuation is seen as essential to well-informed water resource management. Valuation will support a structured mechanism of multi-stakeholder dialogues, helping stakeholders to express their values and perceptions on the use and management of water resources. Assessing and communicating these values is the basis on which stakeholders will seek well-informed decisions in multi-stakeholder platforms.

8. Links to previous and ongoing work

8.1 Previous and on-going work

While critically important for national development, Water Storage Infrastructures (WSI) have not always been successful in responding to local populations' needs. In the Mekong River Basin many of the large WSIs are being developed exclusively as a response to national (or regional) hydroelectricity priorities, often with little consideration for fisheries, local livelihoods, or environment/biodiversity issues.

Several projects have been implemented in the recent past in an attempt to address these issues, such as the 'Mekong Wetland Biodiversity Conservation and Sustainable Use Programme', the IUCN 'Strengthening pro-poor wetland conservation using integrated biodiversity and livelihood assessment' project (Springate-Baginski et al. 2009) or the Australian National University 'Economic valuation of wetlands in Vietnam's Mekong Delta' project (Do and Bennett 2006). Through collaborative research, stakeholder dialogue addressing environmental flows and/or economic valuation, these studies highlight that the uncontrolled modification of flows, particularly through WSIs, is a major issue in the Mekong basin.

Earlier CPWF projects on improving water allocation in the Mekong basin or in the Tonle Sap (CP 67 and CP71) and participatory modeling (CP25) are also worth noting as they offer valuable experiences in designing assessments/methods that enhance capacity of local stakeholders to engage in planning decisions. These different projects developed and field tested various tools to improve stakeholders' coordination through the collective identification and assessment of scenarios of change and action plans.

A range of fisheries valuation studies implemented in the region (e.g. Baran et al. 2007) also highlight that fisheries and aquatic resources—although crucial to the income, livelihoods, and subsistence of the local population—are often overlooked and undervalued by scientists and government planners (Ratner et al. 2005).

In sum, participatory valuation studies implemented in recent years indisputably improved understanding of the positive and negative impact of WSIs on livelihoods, ecosystem services, and downstream communities. However, with the major exception of the IUCN project mentioned above, few of these valuation studies have been implemented in a truly integrated and all-inclusive manner. Instead, emphasis is commonly put on one dimension only (environment, fisheries, hydro-power, or agriculture). As recognized by L. Emerton "Putting integrated assessment into practice presents many challenges; most people have specific technical skills and experience which apply to only part of the process" (Emerton 2005).

In this proposal, we use the term *total value* of WSI to refer to the integrated social, environmental and economic value of water uses related to existing or future WSIs.

8.2 Lessons learned

From valuation projects completed in the Mekong basin and other parts of the world (e.g. Birol et al. in press), several lessons can be drawn.

First, there is wide recognition that water resources are increasingly under pressure, facing growing demand from different uses and activities (e.g. Laplante 2005). Very real and particularly difficult choices will have to be made in many basins—the Mekong basin being one particularly important case given the number of people who depend upon the basin's water resources and the rapid pace of infrastructure development. As these choices are often likely to benefit some stakeholders at the expense of others, negotiation and conflict resolution tools are increasingly required. In particular there is an urgent need for tools and approaches that can help stakeholders reach agreement on sharing and allocation arrangements for water-related goods and services.

Second, WSIs often reduce the economic value associated with certain types of water use (e.g. fisheries) while increasing the value associated with other uses (e.g. energy). Therefore, even though in aggregate the total economic value of water use may be higher with WSIs than without, it is the change in economic value across different types of uses and different types of users that ultimately matters. In other words, planning and investment should not be driven by economic efficiency alone. Distributional considerations are also critical.

The third lesson draws upon the point above and highlights the limits of economic valuation analyses. As many recent reports concluded (e.g. Turner et al. 2004), indiscriminate use of purely economic approach risks overemphasizing "monetary expressions of value" at the expense of two other important dimensions: environmental values, such as the role of water flows in maintaining biodiversity and ecosystem integrity, and social values, such as using water to grow food or fish to ensure food security. Better integrated valuation frameworks are needed that recognize the multi-use/multi-user nature of water as a commodity and as a public good, giving equal consideration to water's economic, social and environmental uses.

Fourth, there have been to date very few attempts to integrate biodiversity assessment, economic valuation, and livelihood analysis within a single framework. At best, assessments are carried out separately and brought together only at the final analysis stage. More commonly, a single aspect of resource use or management is investigated in detail, while broad (and often uninformed) assumptions are made about other elements. This indicates a need to develop new integrated assessment methods which bring together these different elements under one unique water value framework. The tool kit developed by the IUCN Integrated Wetland Assessment (IWA) project is one of the first successful attempts to do so, but its core focus is on wetlands (Springate-Baginski et al. 2009).

Finally, as underlined by the World Commission on Dams guidelines, sound valuation of water services can only be done through a process involving all stakeholders and through an analysis including many disciplines (not simply economics). Top-down valuations of water resources by external experts/economists have to be complemented by bottom-up/participatory processes and must reflect multi-disciplinary and gender sensitivity (WCD 2000).

The ambition of the six national and international institutions involved in this research proposal is to draw upon these lessons to develop a science-based framework addressing water valuation in relation to WSI in the Mekong basin, and to respond in particular to the Basin Development Challenges (BDC) described in Sections 5 and 7 above.

9. Research questions

The following are the research questions that this project should address:

- What is the value of alternative and multiple uses of water relative to a narrower focus on hydro-electric power generation or irrigation?
- To what extent can declines in the value of water, as a result of being used for alternative purposes, be mitigated to sustain the value of water for hydropower?

How will your research address these research questions?

The project will develop and apply an integrated water valuation framework for assessing the total value of water-related services in the context of the Sesan, Sre Pok and Sekong River (3S) basins, with the objective to provide practical and policy-relevant information to national and regional policy-makers and stakeholders. The project is designed as an all-inclusive package of activities and outputs, but will additionally benefit from the close institutional and scientific links that exist with the other BDC projects submitted by the IMWI-WorldFish-ICEM consortium (Projects 1 and 3).

Our analysis will include a direct integrated assessment of WSI for agriculture, fisheries, ecosystems, and hydropower and apply it to the situation of the Nam Theun 2 dam in Laos, the Sesan 3a and Sesan 4 in the Se San basin in Vietnam and the Lower Sesan 2 dam in the same basin in Cambodia.

In the Mekong region and the 3S basins in particular, one of the critical issues faced by policy makers is the lack of clear understanding about the complex interactions between the different development opportunities and threats created by the different cascades of recently-built (or future) dams. A good illustration is the situation of the Nam Theun 2 dam, where the latest WorldBank-ADB report highlighted the “commendable progress” made by the project in terms of infrastructure, but noted the “challenges that the resettled populations are facing in their transitions to new income generating opportunities”.

More broadly there is a lack of value analysis and decision tools to help identify and quantify the distributional consequences of existing or alternative reservoir development pathways. The recent discussion paper on "Development of Scenarios and Modeling Tools for Use in the 3S Rivers Basin" (Tilman et al. 2009) suggests for instance a policy focus on Social Development supporting the Millennium Development Goals, especially on poverty, education, health etc. The report, however, concluded that "More work needs to be done to understand the implications of this sort of social development scenario".

Our valuation framework will be developed to specifically identify and quantify the values of multiple uses of water in the different dams assessed and compare them to the value of existing or future hydro-electric power generation. The objective is to provide science-based information and analysis specifically relevant to the first research question listed above.

In addition, our valuation framework will integrate a modeling/scenario component. Scenario analyses have been frequently used in the past in the Mekong Basin to estimate the potential impacts of hydropower developments –see e.g. the 'World Bank Mekong Development Scenarios', the 'Nam Theun 2 Cumulative Impact Analysis', the 'BDP 1 Scenarios for Strategic Planning' the 'Built Structures Hydrological' modeling report and the BDP 2 results (all reviewed in Baran et al. 2009).

Our scenario component will rely on the HEC-ResSim model (see section 10.5 below for detail). The objective of this tool is to evaluate alternative options for development and investment and to assess consequences of different water management scenarios. Through this scenario component the project will directly address the second research question above.

Note that valuations and scenarios carried out through the project will not necessarily show that alternative development options (fisheries, irrigations, etc.) yield higher *monetary* values than hydropower. But they will help identifying/highlighting trade-offs and potential losses due to opportunity costs. It is well recognized for instance that environmental flows even if critical in maintaining not only biological diversity but also food and nutritional security for local populations, are often found to 'generate' lower monetary values than hydro-power. In such cases, it is not necessarily instructive to systematically convert services and uses into monetary value. As long as these 'values' are weighted explicitly in public dialogue and decision-making, this can contribute to a more complete understanding of the implication of alternative infrastructure development and management options. In that context, our scenario exercises will also be designed to explore alternative mechanisms (e.g. technologies, institutional interventions) to mitigate the potential decrease in water value induced by the adoption of these alternative options.

10. Research Outputs, Methods and Uptake Pathways

10.1 Project research outputs (from MTP)

Main responsibility

- Information on the costs and benefits of different uses of WSI water at reservoir and catchment levels
- Improved methods for water valuation in different uses

With Project 4:

- Application of information on water valuation to multi-stakeholder dialogue on water use

What additional research outputs should the project produce, if any? What does the output(s) add to the BDC?

The project is designed to produce the following 4 major outputs:

Output 1. Total value of water multi-uses estimated in the 3 focal basins
The primary output of this project will be the estimate of costs and benefits of different uses of WSI water in the three focal basins. Through this output the project will expand and strengthen knowledge and information about existing water uses and development scenarios. As such it will directly address the first research output identified by the CPWF above.

In parallel, the modeling module will allow the project to explore the potential trade-offs of alternative development scenarios at selected sites and provide an understanding of how sensitive key socio-economic and environmental indicators are to these development scenarios. This component will directly contribute to Project 4 on water governance by providing a building block to facilitate multi-stakeholder dialogue on water uses. The modality for this will be finalized with Project 4 team during the Basin Inception Workshop.

Together these two components—valuation and modeling tool—- are expected to promote a more complete understanding of how water resources are used and managed and how alternative uses could lead to improved WSI water allocations in the selected sites. Additionally, the aim is to generate and disseminate policy-relevant tools/lessons for application in other river basins in the developing world.

Output 2. Integrated water valuation framework developed and field-tested
The second primary output of this project will be the development, implementation and field-testing of an integrated valuation framework for WSI's water uses. Through this output the project will directly addresses the second MTP project research output identified by the CPWF.

The design and testing of this framework which aims at assessing the total value of water uses *in an integrated manner* will be an important International Public Good. While we acknowledge that promising advances have been made recently to develop integrated frameworks in relation to wetland use values, similar methodological breakthroughs have yet to be achieved for other major resources and in particular for water uses and WSIs. The objective of this proposal is to develop and test –in the particular context of the 3S basins- such integrated valuation framework.

Output 3. Scientific and communication outputs
The project will produce several types of scientific and communication outputs:

(a) A series of publications summarizing/synthesizing the project main results. These will include one comprehensive methodological report presenting the conceptual work (integrated water valuation framework and modeling tool), and a series of scientific articles summarizing the results of the framework applied to the three focal basins (ideally one paper per basin plus one regional synthesis). Through these publications the main results of the project will be communicated to researchers, experts and practitioners involved in similar questions in the Mekong and other basins in the developing world (see Section 10.3 below).

(b) A series of policy briefs and leaflets for policy-makers, planners and civil society produced in Vietnamese, Lao and Khmer, summarizing the main findings and recommendations of the project, plus one additional brief in English synthesizing these recommendations at the regional level. The

expected outcome is increased awareness and capacity of local and regional planners, policy-makers and managers to apply this integrated framework for planning and management of present and future WSIs in the Mekong and elsewhere.

(c) An open access website specifically aimed at disseminating widely the progress, outputs and main results/recommendations of the project. This website will be hosted by the CPWF basin focal project (project 5), with WorldFish responsible for providing updates to content from Project 2.

Output 4. Capacity building in integrated water valuation techniques
Since integrated valuation of water is not well established in developing countries, in particular in the Mekong region, capacity building will be an integral part of the work, embedded in all activities of the project. Policy-makers and planners at the district, national and regional levels will benefit from the implementation of the scenario exercise and from participation in the expert/stakeholder consultation. Conjointly, on-the-job training in valuation methods, data analysis and joint authorship of publications will offer important capacity building opportunities for local partners.

10.2 Project partners

The project will mobilize and rely on the complementary expertise of a team of analysts with long practical experience and solid theoretical background. As most activities are highly complementary and integrated, the majority of the team members will be involved across the full range of activities. This setting will ensure the unity and efficiency of the team work and increase the long-term coherence of the project. Within this integrated working approach however, leadership and responsibility for specific tasks will be allocated to different partners, based on their experiences and skills, as follows.

The development of the conceptual framework for integrated water valuation (*Output 2*) will be the result of a multi-disciplinary effort by all senior analysts of the team (cf. Steps 1 to 4 in Section 10.5 below). However, to ensure the overall cohesion and scientific rigor of the process, the main responsibility will lie with the Resource Economists of IFPRI and ICEM with the support of the rest of the senior researchers.

The local partners—selected because of their intimate knowledge of the local context at the three sites and their involvement in previous valuation analyses (cf section 14 and individual CVs)—will coordinate the various grassroots and national-level activities within each focal basin. They will play in particular a leading role in the organization and implementation of the data collection fieldwork.

Once data have been collected, the resource/environmental economists, livelihood specialists, and geo-referencing analysts will undertake thorough analysis. In parallel the ICEM water engineer will supplement the existing HEC-ResSim model by incorporating the new data generated by the project. As part of the capacity building component of the project (see below), members of the national institutions will be invited to engage and contribute to the different data analyses.

Responsibility for capacity building in data analysis, valuation methods (*Output 3*) and scientific publications and communication (*Output 4*) will lie with the international partners as part of their continuous engagement in the project. The project leader (through WorldFish Mekong regional Office) will however pay particular attention to this aspect by monitoring the quality of national partner involvement in the different stages of the research process.

10.3 Next users

Outputs 1 & **4**
The targeted users of the valuation data (*Output 1*) and associated scientific outputs (*Output 4*) are national research institutes and universities (e.g., SUMERNET), government agencies (e.g., NMCs, ministries of water resources, energy, rural development, environment, and agriculture) and regional bodies (MRC, GMS), as well as international research agencies and NGO networks (e.g., M-POWER) involved in managing and planning water resources.

Policymakers in the basin will be informed of the role and value of water services in the 3 focal basins through targeted distribution of policy briefs to key agencies, and presentations and deliberation on findings at CPWF project 4 dialogue events and other regional forums.

The use of an open access website will also ensure that the information is made available to civil society and other stakeholders (see section 12.1 below). The estimates of WSI's total values are also expected to be useful outside the initial area of work (Mekong basin) through the principle of the benefit transfer method.

Output 2
Within the Mekong basin, the main users benefiting from the development of the integrated framework (*Outputs 2*) will be the national research institutes and universities, government agencies and basin water entities involved in managing and planning water resources (as detailed above). International research agencies and NGOs engaged in water resource management should also benefit. Finally, by its generic nature the framework is expected to be also useful in other basins within and outside the Mekong region.

Output 3
The project workshops will favor scientific "North-South" and "South-South" exchange. In particular the CG and ARI centers will assist the national partners in updating their knowledge on valuation techniques during the technical workshops (preparatory workshop and feedback workshop –see Gantt chart). South-South exchange will be strengthened through national partners' participation in the various technical and field fieldwork activities and regional forums.

10.4 Learning required by next users

The Changes in Knowledge, Attitudes, and Skills (KAS) necessary to ensure successful outcomes for this project are summarized below.

Change in Knowledge
Through the dissemination of the information regarding the integrated value of alternative water uses and its distribution in the three focal basins (*Output 1*), policymakers and planners will be made aware of the existing and potential alternative costs and benefits of water services. In an ideal world this improved information would/should lead to policy changes, including enhanced awareness for 'non-hydro-power' WSIs values. Experience suggests however, that policy is not a linear process and that increased access to information or knowledge is not always sufficient to 'trigger' change in attitude (or in policy).

Change in Attitude

To ensure change(s) in policy and planning, improved governance and accountability are also required. The present project will contribute to this through various means. First, information regarding the WSI's total value will be circulated to main decision-makers and water planners through an expert-to-expert dialogue. Conjointly, the project will also increase the access to information (change in knowledge) in the civil society, local population and other main stakeholders (including the national media) through the open web-site and leaflets published in local languages (*Output 4*). The communication of the results to the civil society is expected to improve its capacity to engage directly or through the media with the policy makers and lead to an improved governance (more participatory) decision-making process.

Change in Skills
Scientists and practitioners (including project partners) will learn how to apply—and eventually improve—the integrated water value framework developed by the project (*Output 2*) through on-the-job training for project partners (*Output 3*) and through the various technical publications (*Output 4*). The methodology report will present in detail the different steps of how to plan and implement this integrated valuation framework, and the scientific papers will provide technical discussion adapted to the local-specificity of the different sites.

In addition to these expected changes, the project will also 'feed' directly Project 4 on water governance. Through this feed process, it is expected to contribute to another chain of changes involving this time the stakeholders of Project 4 and more broadly of the Mekong BDC.

10.5 Research methods

The methodology and activities are presented below. A Gantt Chart illustrating how these different activities are articulated and linked to each other, is provided in section 11 below.

Inception stage
Consolidating and refining the links with the four other projects will take place during the Basin Inception Workshop (BIW 7-9 Dec 2009). If/where necessary, adjustments will then be made to reflect the results of the BDC Impact pathways analysis completed during the BIW. The BIW will also be used to formalize the exchange platform by which the project will engage more effectively with Project No.4.

Conceptual stage
Step 1. Formation of a multi-disciplinary team
This initial step has already been completed during the preparation of the proposal when the different partners have identified amongst their staff the group of experts who will constitute the project team. Their expertise includes:

- economic and natural resource valuation
- livelihoods survey and participatory research methods
- hydrological modeling
- geo-referencing and spatial mapping
- policy analysis

Step 2. Current state of knowledge and focal issues
A desk-based review will collate all available relevant information from the existing literature. Sources will include published papers, 'grey literature', and online databases such as the Regional Technical Assistance (RETA) website http://reta.3sbasin.org/ and in particular the 3S GIS layers Data

Base that contains updated maps, census data and other government statistics. The latest version of the MRCs hydropower database, supplemented with information from the hydropower Oxfam database will also be included. For Nam Theun 2, the very comprehensive socio-economic data-base being compiled under the World-Bank/ADB supervision project represents a very informative set of data.

Note also that the project has been purposely scheduled to start in Sept 2010 in order to benefit also from the preliminary analyses and data generated by project 1.

Step 3: Framework design

A series of preparatory e-consultations between the senior economists will be organized to discuss the coverage of the study and the economic methods to be used for the valuation exercise. Various methods are more or less suitable for different kinds of costs and benefits (Young 2005). Market price and surrogate market price techniques are most suitable for direct values, while indirect values are commonly measured using cost-based and production function approaches. Stated preference methods are, in principle, applicable to any category of benefit, and provide some of the few available methods to estimate option and existence values. They also have the advantage to express directly the value that local people place on services. In that context they could be critical to ensure the participatory nature of the exercise.

A technical workshop will be organized in order to allow the different 'discipline specialists' to discuss these technical questions. External regional experts will also be invited to contribute their knowledge and expertise to the process. These different tasks will be implemented under the coordination of the project leader but the decision process will be collegial.

Step 4. Field sampling programme and planning matrix

At this stage of the planning process, the team will decide which subset of information to collect. This needs to be determined in an integrated way, involving researchers from the different subject areas, with a strong focus on identifying the links between the various information sets. For this a data collection planning matrix will be completed following the methodology developed by Springate-Baginski et al. (2009). The main advantage of this planning matrix is to ensure all relevant information is collected through a minimum survey effort, thus avoiding duplication of data, or multiple, time consuming and expensive, surveys focusing on discipline-specific, and consequently restricted, information.

Field Work

Step 5. Field implementation

Field work will be conducted in the three sites selected. Preliminary training and pilot survey will be completed before the main data collection is undertaken. The exact combination of techniques used to collect these primary data will be finalized during the planning workshop (*Step 4*). These will include qualitative and quantitative economic and livelihood analysis, with the primary aim to:

- understand and quantify the livelihood outcomes (in terms of income, nutrition, health, gender equality) of water resources from WSIs as well as the related livelihood strategies (fishing, irrigated farming, etc) and stakeholders (i.e. beneficiaries, farmers, fishers, general public, future generations, etc.);
- capture the value of the benefits/services generated by these water resources and related livelihood strategies, and estimate the contribution of those to different stakeholders' livelihoods outcomes.

Within these surveys, gender-specific sampling frames will be systematically adopted. Note that a common geo-referenced framework will also be used in order to link all the data. The benefits of using this geo-referenced data set will be critical during the data analysis, modeling and feedback and policy engagement –see below.

Data and Scenario analysis

Step 6. Valuation exercise

Using the data collected during the field survey, our analysis will aim at assessing integrated WSI water uses. This technical part of the work will be led by the senior economists of IFPRI and ICEM together with critical input from the livelihood experts from WorldFish, CEPA, and DFL-MFA. The integrated nature of the valuation exercise will be ensured through ongoing information exchange between the different analysts. Geo-referencing will also facilitate this process by ensuring that the specialists are all working at the same relevant spatial scale.

Step 7. Scenario analysis

In addition to the valuation framework, a modeling/scenario component will be implemented using the HEC-ResSim model. The HEC-ResSim is a regional water management model built to simulate reservoir operations and up/downstream river flows. Its description of catchment hydrology is somewhat simplified when compared to distributed hydrological models, however it can provide greater detail at the reservoir and cascade decision-making level. Through its components, HEC-ResSim allows the user to simulate single reservoirs and scale up to complex interconnected cascading systems. It also allows the user to incorporate power plants, spillways, multiple outlets and diversions (for environmental flows, or irrigation). The model is suited to scenario-based analysis because it supports the detailed input of reservoir operating rules and sensitivity to changes in the component architecture, appropriate for exploring the ramifications of possible management decisions.

Feedback, communication and policy engagement

Step 8. Evaluating the new conceptual framework

As part of the process of field-testing the valuation framework, a technical workshop will be organized a few months after the completion of the field work. Results of preliminary data analyses will be presented, and potential technical issues/limitations/flaws identified and addressed. Lessons will be drawn and adjustments will be made (if necessary) to perfect the methodology. These various points will then serve as the basis of the first scientific output of the project –see section 10.1).

The workshop will also be used to perfect the integrated assessment process itself by ensuring that the data analyses conducted by the different analysts are conducted in an integrated manner.

Step 9. Dissemination

The last part of the project will consist in a series of communication activities to ensure the dissemination of the various results and conclusions of the earlier stages of the project. The elements of this communication component are presented in greater detail in section 12.1.

10.6 Participatory research approaches

Elements of information regarding the participatory nature of this project have been provided in sections 10.1 to 10.4 above. To sum up, the research and capacity building activities of the project have been designed to ensure the optimum adoption and best use of the outputs of the project. In particular:

- Both qualitative and quantitative fieldwork will be undertaken in the three focal basins to ensure that locally perceived water values and uses are correctly assessed.
- During the various prepartory workshops, experts working on water valuation in the region will actively help design the research framework and toolkits.
- Results of the valuation exercise (*Output 1*) will be disseminated not only to the decision and policy-makers but also to the local population and wider civil society through short publications in local languages (Khmer, Lao and Vietnamese) (*Output 4*).
- Scientific publications of the main results (*Output 2*) will be submitted to specifically relevant internationals journals with scope and interests in water resource management, such as the *Journal of Water Resource Planning & Management*; the *International Journal of Water Resource Development*; or the *International Journal of River Basin Management*.
- In term of capacity building, specific attention will be paid during the planning and implementation stages and throughout the data analysis and writing/publication to ensure that local partners fully contribute to the research and planning process (*Output 3*).

10.7 Change in user practice

The premise of the project is that improved information on the value of WSI water—and, in particular, the integrated social, environmental and economic value of these WSI uses—will lead to improved management and planning in ways that better reflect the actual multi-use/multi-user nature of these reservoirs - thus leading to fairer and more equitable development opportunities for all water users. These improvements are expected to trigger changes along a chain of processes and outcomes as follows:

- better appreciation by policy-makers of the fisheries, agriculture and aquatic ecosystem services –along with hydro-power generation—as essential contributors to poverty reduction.
- ***Indicators of success***: Evidence of a more supportive policy environment for change in national and/or basin-level policies related to hydro-power infrastructure development and complementary sectors (agriculture, fisheries, water and environment) in the Mekong Basin.
- improved visibility of non hydro-power sectors (fisheries, agriculture, environment) and increased transparency in the policy and decision-making process.
- ***Indicators of success***: Evidence of increased engagement of the main stakeholders (in particular local communities or their representatives) into reservoir planning processes at both national and regional level, evidence of the increased integration of the non hydro-power sectors in the planning of the future reservoirs in the Mekong Basin.
- enhanced capacity of regional and/or national experts (governmental and non-governmental agencies) in implementing integrated water valuation analyses.
- ***Indicators of success***: wide adoption by practitioners of the integrated water framework developed by the project, number of citation/Google counts of the scientific outputs (articles and methodological report), improved abilities of local NGOs and civil society to understand and debate the impacts of changes in water allocation and uses.

10.8 Suggested sites

- **Laos**: the Nam Theun 2 dam in the Nam Theun basin or Theun Himburn (operational) and its proposed extension
- **Vietnam**: Yali Falls in the Se San basin dam cascade (but feasibility of other Sesan dams still needs to be checked), i.e. the Sesan 3a and Sesan 4 dams
- **Cambodia**: the Lower Sesan 2 dam in the Se San basin

11. Activities and Implementation Plan

*In the form of a **Gantt chart**, constructed as an Excel spreadsheet, which is part of the project workbook.*

12. Communications and alignment with CPWF Culture

12.1 Communications

The project is expected to contribute to the following communications products:

- A series of innovatively-designed products that communicate research findings to a range of stakeholders with a diversity of interests
- Working papers, journal articles and book chapters, particularly in Mekong-based journals and edited volumes, that describe the cumulative impacts of dam operations on downstream resources (particularly fisheries) and livelihoods; that reveal both the positive and negative impacts of hydropower and irrigation at livelihoods levels; that describe the costs and benefits of altering dam operations to the benefit of alternative, non-hydroelectric uses; and that analyze the utility and effectiveness of negotiation techniques across borders and between stakeholder power asymmetries.
- An open access website with contributions from CPWF partners and stakeholders

Briefly describe your communications plan

Our communication plan relies on the following expected outputs (as detailed above in section 10.1):
A series of academic publications including

- a methodological comprehensive report presenting the conceptual work (integrated water valuation framework and modeling tool) as developed and field-tested by the project. This report will be targeted at scientists and practitioners with research and/or pragmatic interests in water valuation issues.
- a series of scientific articles communicating the empirical results of the framework applied in the three focal basins. Preliminary results and draft versions will be presented at regional or international conferences for peer comments.

These academic materials will be complemented by

- a series of policy briefs and leaflets for policy-makers, planners and civil society –one for each focal basin- in Vietnamese, Lao and Khmer respectively, summarizing the main findings and recommendations of the project, plus one additional brief synthesizing these recommendations in English. These products will be designed in dialogue with a reference group of planners, to ensure that they address the most timely, practical questions in a way that will be understood by the primary users.
- an open access website specifically aimed at disseminating the progress, outputs and main results/recommendations of the project and hosted by the CPWF basin focal project 5. Its content will be updated regularly by the project team.

In addition, emphasis will be placed on integration of communication activities across the five basin projects through:

- the establishment of a formal feedback process through a series of local and regional workshops to validate the main conclusions of the valuation exercise;
- an active dialogue with Project 4 through a formal exchange platform to ensure that the valuation results of this project are fully accounted and integrated into the governance analysis and the various dialogue events organized by Project 4.

Finally, it is expected that the Geographic Information System (GIS)-based mapping tools will greatly increase the capacity of the project team to communicate the main results and to engage with the next users (local and regional stakeholders, water policy planners).

12.2 Evaluative culture

Briefly describe how you will support an evaluative culture in the project

Self examination and learning

From the outset, the project will foster self-examination and uptake of research results through a clear action-research approach. The learning process will therefore be ongoing throughout the project. This process will be reinforced through: (i) the organization of field visits and support visits; (ii) an evaluation workshop just after the completion of fieldwork (cf. step 8 *Evaluating the new conceptual framework*). The objective of this workshop will be to address potential technical issues which may have occurred during the implementation of the field work and/or preliminary analyses of the data. Lessons will be drawn and adjustments made in the methodology.

Monitoring and Evaluation

The project's M&E plan aims to ensure a timely and quality delivery of the outputs in accordance with the original schedule and in line with project objectives. To ensure this, a self-monitoring system has been set up, with 7 milestones (A-G) identified across the 5 phases, and spread along the 32 months of the projects (see Gantt chart). These milestones will allow the team to monitor closely the progress of the work. The M&E plan will also benefit from specific standardized procedures established internally by the CG lead-center (WorldFish) as part of its own WorldFish-M&E program, based on internal milestone system. Through this WorldFish-M&E specific program the project will benefit from additional institutional support on this aspect of its implementation.

12.3 Alignment with CPWF core values

Multi-disciplinary research is at the core of this project as evidenced by Step 1 of the methodology section –see also section 14.

Within the project, **capacity building** is an integral part of the work, embedded in all activities and focusing on various groups of stakeholders. Policy-makers and planners will benefit greatly from the implementation of the scenario exercise and from the expert/stakeholder feedback workshop. Conjointly, on-the-job training in valuation methods and involvement in the data analysis and publication will offer important capacity building opportunities to the staff of the national partners involved in the project.

When it comes to access and use of water, **gender** is a critical element. All fieldwork and data will be administered and handled with a gender-sensitive approach (see section 10.5 on methodology). Through their past engagement in action-research all members in the team (males and females) have developed a deep awareness of this gender issue.

13. Assumptions and Risks

Assumptions

The project relies on the assumption that there will be, or can be fostered, a level of willingness among stakeholders and in particular decision-makers and planners to move away from mono-sectoral planning approach, to embrace a more appropriate (but more challenging and complex) integrated planning process.

By identifying and valuing in an integrated manner the multi-use/multi-users nature of WSIs, the project is intended to provide the necessary initial information to facilitate this shift of paradigm and to contribute to the development of successful multi-stakeholder dialogue on water uses in the basin.

Risks

Due to the relatively small budget available for this project and the need to work in 3 different focal basins across three countries, there is a risk that the partners spread their effort/resources too thinly between these different sites.

The team members are well aware of this potential risk and will use their long experience in project planning to reduce it. Additionally the project team will also rely and draw on its very close institutional links with projects 1 and 3 to benefit from scientific and logistic synergy during the implementation of the various phases of the project.

14. Project Team[iii]

Names of team members	Professional discipline	Institutional affiliation and address	Area of expertise important to this project.	Brief description of research responsibilities with respect to the outputs and activities listed in the Gantt chart.	Commitments
Chris Béné [Project Co-Leader]	Development Economics - Socio-economics	WorldFish Center, Penang, Malaysia	Poverty assessment and Natural Resource Management ; rural livelihood analysis ; valuation ; environmental and resource economics	Overall coordination of the scientific part of the project – contribute to the development of valuation methodology and data analysis – coordinate and contribute to scientific publication and communication	cf CV
Jeremy Carew-Reid	Environmental policy and institutional development	ICEM, Hanoi, Viet Nam	Strategic environmental assessment, integrated river basin management	Strategic overview of the project – liaise with Projects 1 and 3 – contribute scientific publication and communication products	cf CV
Peter-John Meynell	Environmental Assessment specialist	ICEM, Vientiane, Laos	Natural systems ecology; biodiversity and environmental assessment	Provide strategic support to project – contribution to valuation methodology, scientific publication and communication	cf CV
Benoit Laplante	Environmental Economics	ICEM, Hanoi, Viet Nam	Economic valuation of environmental impacts and ecosystem services	Coordinate the development of the valuation methodology (with E. Birol) – contribute to data analysis, and scientific publication	cf CV
Tarek Ketelsen	Water Engineer	ICEM, Hanoi, Viet Nam	Water Resource management/modelling	Lead the modeling component – liaise with Project 3 – contribute to data analysis, georeferencing and publication	cf CV
Mark Dubois	Participation, Power and Social Change	WorldFish Center, Phnom Penh, Cambodia	Participatory research methodologies, Rapid Rural Appraisals	Support national partners in preparation of survey and data collection - contribute to data analysis, scientific publication and communication	cf CV
Yumiko Kura [Project Co-Leader]	Environmental Science and Policy	WorldFish Center, Phnom Penh, Cambodia	Freshwater biodiversity assessment and conservation approaches, Environmental assessment and monitoring methods	Overall coordination of the project in particular regarding the national level – Contribute to methodology development and data analysis, scientific publication and communication	cf CV

Names of team members	Professional discipline	Institutional affiliation and address	Area of expertise important to this project.	Brief description of research responsibilities with respect to the outputs and activities listed in the Gantt chart.	Commitments
Hooi Bing Chin	Data and information management and sharing	WorldFish Center, Penang, Malaysia	Technical and organizational support to	Responsible for coordination of online communications and publication production processes, and support project members in field work planning, data management and analysis	cf CV
Samonn Mith	Community development	WorldFish Center, Phnom Penh, Cambodia.	Technical and organizational support to development agencies and governments; community development activities and local capacity building	Responsible for organizing project meetings/workshops and supporting the co-project leaders in managing the partner relations and field activities	cf CV
Suan Pheng Kam	Agronomy-Soil Science, Agro-ecosystem analysis	WorldFish Center, Penang, Malaysia	Geospatial analysis (remote sensing, GIS, GPS) and modelling applications; Poverty and vulnerability mapping	In charge of the geo-referencing of the project data, liaise with project 1 and 3	cf CV
Ekin Birol	Economist	IFPRI, Washington, DC, USA	Economic valuation; Quantitative livelihoods analysis	Coordinate the development of the valuation methodology (with B. Laplante) – contribute to data analysis and scientific publication	cf CV
Claudia Ringler	Agricultural Economist	IFPRI, Washington, DC, USA	Economic valuation; Water valuation and modeling	Provide strategic input into methodology and publication	cf CV
Bunnarith Tep	Gender analysis - Community development	CEPA, Phnom Penh, Cambodia	Institutional and social analyses - Environmental/Social Impact Assessment	Supervise field work and data collection in Cambodia - contribute to data analysis and communication	cf CV
Vu Xuan Nguyet Hong	Development Economics	CEIM, Hanoi, Vietnam	Water resources management; agricultural and natural resource policy	Supervise field work and data collection in Cambodia - contribute to data analysis and communication	cf CV
Chanthaboun Sirimanotham	Community development – Fisheries and aquaculture	DLF, Vientiane, Laos	Alternative livelihood options in resettled population; community organization	Supervise field work and data collection in Lao PDR - contribute to data analysis and communication	cf CV

Provide a brief text statement on why the lead institution is well-placed to lead the group.

Lead-institution: **The WorldFish** is an international non-profit research organization supported by the Consultative Group on International Agricultural Research (CGIAR). WorldFish is working in partnership with a wide range of government and non-governmental agencies at regional, national and local levels in the developing world, and with advanced research institutions worldwide. Its mission is to reduce poverty and hunger through research for development in fisheries and aquaculture, and the key expertise are in Economics, Social Sciences, Natural Resource Management, and Aquaculture. WorldFish has a long track record as coordinator/leader of international research projects in various part of the developing world. In the Mekong basin, WorldFish has implemented a number of research projects on hydrology-fisheries interactions, impacts of dams on fisheries, valuation of wetlands and aquatic natural resources, and fisheries-dependent rural livelihoods, jointly with local government and non-government partners, and also collaborated with key regional intergovernmental bodies such as FAO and MRC, on various joint projects. WorldFish has lead and contributed to a number of CPWF Phase I projects, including CP/PN71 – 'Water allocation in Tonle Sap', CP/PN 35 'Community-Based Fish Culture', and CP/PN 10 'Coastal resource management for improving livelihoods' and contributed to expert meetings and stakeholder consultation processes organized by the MRC Fisheries Programme, the Basin Development Plan, and the Hydropower Programme. The Center has a regional office in the Mekong Basin (based in Phnom Penh) where 2 of the 4 WorldFish PIs involved in the project are based (M. Dubois and Y. Kura) and its HQ in Penang (Malaysia) where the other 2 WorldFish senior scientists of this project operate, including the project leader (S.P. Kam and C. Béné).

Provide brief text statements on why the proposed institutions are qualified to carry out the proposed research.

Partner Institution 1: **ICEM - The International Centre for Environmental Management** is an international, independent public interest centre that helps governments, private sector and communities define and implement policies for ecologically sustainable development. It was established in 1999 to help governments and communities in building capacity to use natural resources sustainably and to maintain environmental quality. ICEM operates from offices in Brisbane and Hanoi and has specialists in environmental institution building and strategic planning, environmental economics, environmental assessment, protected areas, biodiversity conservation, GIS and modeling. ICEM works from local to global levels but has a special focus on Asia, and in particular, the Mekong Region for testing and demonstrating sustainable development solutions. ICEM has recently been commissioned by the Mekong River Commission to undertake a Strategic Environmental Assessment (SEA) of 11 planned hydropower dams along the mainstream Mekong River, in Cambodia, Laos, Thailand and Viet Nam. The SEA aims to assess the wider economic, social and environmental implications of the proposed developments. The SEA has been building on the work undertaken by various MRC programs, including the fisheries, navigation and agricultural programs as well the Basin Development Planning process. In addition, ICEM has also contributed to a number of SEAs for hydropower sector plans and conducted climate change impact and adaptation studies in Vietnam.

Relevant Projects:
2009 – 2010: MRC - Strategic Environmental Assessment (SEA) of Hydropower dams on the mainstream Mekong River, implemented in collaboration with the WorldFish Center

Partner Institution 2: **IFPRI - The International Food and Policy Research Institute** is one of the 15 centers supported by the Consultative Group on International Agricultural Research (CGIAR). Its mission is to provide policy solutions that reduce poverty and end hunger and malnutrition. To support its mission, IFPRI emphasizes the sound management of the natural resource base for agriculture and other ecosystem services. IFPRI's water policy research focuses on developing water allocation mechanisms and institutions that increase the economic value of water while supporting increased equity and environmental sustainability. To implement this research, IFPRI researcher Ekin Birol has field experience in the valuation of water resources in Europe and Asia. She will be supported by Claudia Ringler who developed in 2000 a decision-support framework for assessing the value of alternative water uses in the Mekong River Basin across space and time. Both Ekin and Claudia have recently published in top international Journals such as Journal of Water Resources Planning and Management, Water International, or Ecological Economics.

Relevant Projects:
1999-2000: Optimal Allocation and Use of Water Resources in the Mekong River Basin: Multi-Country and Intersectoral Analyses. Collaborative project between the Mekong River Commission Secretariat and the University of Bonn, Germany, [Claudia Ringler]
2000-2002: Economic Value of Water in the Mekong Delta, Vietnam, Under Alternative Mekong River Flow Regimes. Collaborative project between SIWRP, IWMI, and IFPRI
2000-2004: Irrigation Investment, Fiscal Policy, and Water Resource Allocation in Indonesia and Viet Nam.

Partner Institution 3: **CEPA - Culture and Environment Preservation Association** is a non-profit, non-governmental organization founded in 1995 in Cambodia by a group of social and environmental specialists committed to preserving natural resources. The organization focused its work on training young professionals on nature resource management and empowering forest and river dependent communities on resource management. In the past ten years the organization has expanded its interventions to include work on environmental rights, community-based forest management, and research. These efforts has helped indigenous communities and ethnic minorities in the north-eastern part of Cambodia preserve their culture by asserting their rights and at the same time accepting development through the practice of sustainable methods to conserve natural resources. CEPA's activities aim to improve livelihood opportunities of the people and promote equality and equity for women and men to ensure the preservation of traditional culture, the promotion of social justice and sustainable livelihood.

Relevant Projects:
2006 – present: Wetlands Alliance Programme/WorldFish – Sala Phoum (villager research) Project in Stung Treng Province

2007: Darwin Initiative Project and IUCN Freshwater Biodiversity Assessment Programme – Integrated Wetlands Assessment Toolkit testing in Stung Treng Ramsar Site
2004 – 2006: UNDP/GEF/IUCN Mekong Wetlands Biodiversity Conservation and Sustainable Use Program (MWBP) in Stung Treng Province

Partner Institution 4: **CIEM - The Central Institute for Economic Research and Management** established in 1978 is a national institute under the Vietnamese Ministry of Planning and Investment. Its mandate is to undertake research and put forward proposals and recommendations on economic laws and regulations (institutions), policies, planning and management mechanisms, business environment and economic renovation, as directed by the Ministry of Planning and Investment; organize scientific research, training and fostering of economic management officials and organize consultancy activities according to law provisions. CIEM has 90 staff members, working in six research departments and three supporting departments. During the past decades, CIEM has made significant contribution to the economic management policies of Vietnam in the "doi moi" era, especially through its contribution to draft laws and other regulatory documents in the areas of investment environment, economic reforms and policy impact analysis. CIEM is rightly considered one of the foremost think-tank in economic management in Vietnam. CIEM has been collaborating with ICEM on as series of recent project in relation to dams and water policy.

Partner Institution 5: **DLF-MAF - The Department of Livestock and Fisheries (DLF) Ministry of Agriculture and Forestry (MAF)** The Department of Livestock and Fisheries is currently operating under the Ministry of Agriculture and Forestry. Its mandate covers a wide range of issues related to fisheries, aquaculture, and livestock health and management. It has been actively involved in collaboration with the FAO in the prevention and control of Avian Influenza in Laos. In relation to fisheries and aquaculture the Government of Lao PDR, recognizing the need for a national legal framework to be developed to enable the effective management of fisheries and aquaculture, requested the Department of Livestock and Fisheries to undertake this task. The output of this process has been the development of a draft framework for fisheries and aquaculture for further development into national legislation. The DLF has also been actively involved in programmes and/or activities supported by donors such as the enhancing the institutional capacity of local government agencies and women unions in rural remote areas or promoting cultured based fisheries.

The consortium: altogether the 6 institutions described above constitutes a very strong and highly complementing team of scientists and practitioners with expertise in

- strategic issues related to dams in the Mekong basin and in particular in the 3S basin (J. Carew-Reid, C. Ringler, J.P. Meynell, M. Dubois, Y. Kura, C. Sirimanotham, T. Bunnarith)
- economics valuation of natural resources in relation to freshwater uses (B. Laplante, C. Béné, C. Ringler, E. Birol, H. Vu Xuan)
- participatory evaluations and livelihood analysis (M. Dubois, C Béné, T. Bunnarith, C. Sirimanotham)
- environmental and/or biodiversity assessment (J.P. Meynell, Y. Kura, T. Ketelsen)

and individual competences in:

- geo-referencing and spatial mapping (S.P. Kam)
- hydrological modeling and scenario (T. Ketelsen, J. Carew-Reid)

15. Indicative break down of budget

This is part of the project workbook.

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[i] This project is one of several that together constitute a research program to tackle the basin development challenge (BDC). Please read the description of the BDC that can be found in the Medium Term plan. If you are successful you will be expected to work as part of a coherent research program, led by the Basin Leader responsible for program coordination and coherence.

[ii] Project linkages and project contribution are shown in the BDC impact logic model in the Medium Term Plan

[iii] The quality and experience of your project team will help ensure the delivery of quality outputs.