INTERNATIONAL RIVERS NETWORK

Technical Review Of The Mekong Secretariat Report:
'Mekong Mainstream Run-Of-River Hydropower,' December 1994

March 31, 1995

1. BACKGROUND

The Mekong Committee, and its technical counterpart the Mekong Secretariat, were established in 1957 under the auspices of the United Nations for the purpose of coordinating the study and development of the Mekong River Basin. Since its inception, the Committee has completed dozens of studies related to the basin's agriculture, ecology, economics, and natural resources. The Committee has focused particularly on studying the technical and economic aspects of developing large hydropower projects on the mainstream of the river. Indeed, hydropower development could be considered a central goal of the Committee.

From 1970 until 1992, the Committee's development plan remained essentially unchanged; it envisioned constructing a cascade of nine large multipurpose storage reservoirs to supply electricity, irrigation, and flood protection for basin residents. Political, economic, social, and environmental problems associated with this massive scale of development finally forced the Committee planners to abandon their original plans and seek a less destructive approach. In 1992, the Committee commissioned a new study to explore a development scheme with fewer adverse impacts, and in December, 1994, the Mekong Secretariat released its report 'Mekong Mainstream Run-of-River Hydropower' (referred to below as 'the Report').

International Rivers Network (IRN) has been requested to review the Report by the Project for Ecological Recovery, a non-governmental organization based in Bangkok working with communities in Thailand, Burma, Laos, and Vietnam.

This review serves as an initial assessment of the adequacy of the technical, economic, social, and environmental analysis described in the Report. At a later stage, IRN intends to facilitate an independent, in-depth assessment of the environmental and economic impacts of the Secretariat's development plan.

2. SUMMARY OF CONCLUSIONS

The stated purpose of the Secretariat's report was "to determine to what extent viable hydroelectric power developments might be considered on the Lower Mekong

1847 Berkeley Way, Berkeley, California 94703 USA
Tel: (510) 848-1155 / Fax: (510) 848-1008 / E-mail: irn@igc.apc.org

River if the scale of development is deliberately constrained to avoid or to minimize impacts." (Executive Summary, p. 1)

It is clear that the Report cannot be used by the Mekong Secretariat as the technical basis for answering that question for the following reasons:

a) the study's flawed methodology, misrepresentation of project impacts, and inadequate economic and technical analysis have led the authors to draw unsupported conclusions and propose unjustified recommendations;

b) the professional credibility of the Report is further undermined by a pervasive bias towards justifying construction of hydropower both in the selection of assumptions and in its use of subjective judgments; and

c) the publication of the Report demonstrates that the Mekong Secretariat is unfamiliar with current accepted standards in the management of large river basins.

3. FLAWED METHODOLOGY

Contrary to accepted methods of river and watershed planning, which require a multi-objective and systematic analysis of constraints, opportunities, benefits, impacts, and uncertainties associated with major interventions, the authors appear to have approached this study as if managing the Mekong Basin were a simplistic plumbing problem.

The authors ignored the integrated nature of river resources and the fundamental link between river ecosystem integrity and the health of a river basin. Inevitably, this has resulted in fundamental analytical flaws in the Report. For example:

a) No cumulative impact assessment.

No assessment of cumulative ecological or hydrological impacts is included in the study. The impacts of this plan, with its numerous large-scale projects, will certainly not remain isolated and independent.

b) Lack of definition of "viable" development.

The word "viable" is used in the Report to describe a threshold which determines the acceptability or unacceptability of a particular project but is never clearly defined. Nowhere in the Report are definitions provided for "acceptable" or "unacceptable" environmental or social damage. While the Report discusses resettlement and environmental impacts as considerations, its viability threshold is based primarily on economic criteria. It appears to be left to the anonymous authors (who are presumably hydraulic engineers) to determine the level of acceptable damage to communities and ecosystems.

c) Impacts not minimized.

Although the objective of this study was to "avoid or minimize impacts," the Report does not systematically attempt to do so. Instead, selection of dam locations and heights are based more on economic and engineering criteria, with the number of relocated people a secondary consideration (see Fig 6-4), and environmental impacts not even entering the selection process.

At the very least, the consultants should have shown the basic relationships between reservoir height, population displaced and kilometers of river ecosystem destroyed, and then demonstrated trade-offs between power revenues and impacts in a systematic optimization analysis.

d) Biased representation of experience with hydro dams.

Given that the authors of the Report are heavily dependent upon dam construction (Acres International and the Compagnie Nationale du Rhône), it is perhaps inevitable that they would state that the "successful development of some European Rivers... was considered to be a model" (p. 1-3). An objective qualified consultant would have evaluated the real costs and benefits of the projects on heavily developed rivers such as the Rhine, Danube, Rhône (and Mississippi), and would have been unlikely to recommend the development of these rivers as models in view of the growing recognition of their poor economic performance and ecological costs.

4. MISREPRESENTATION OF PROJECT IMPACTS

The approach, analysis and assumptions used in the Report are biased towards justifying the feasibility of hydro dams regardless of their significant ecological, social and economic impacts. This bias makes the Report of limited use in addressing the terms of reference of the study. Specifically:

a) Misrepresentation of the scale of the project.

The Report attempts to give the impression that these projects are small dams, without storage reservoirs. In fact, what is proposed is a staircase of dams 30 to 60 meters high with reservoirs covering more than 600 kilometers of the 1800 kilometers studied. The six dams and reservoirs recommended are on a comparable scale to Bonneville Dam on the Columbia River in the US Northwest. Such massive dams cannot be considered "run-of-river" projects.

b) Environmental impacts judged "not severe."

The cascade of dams would fundamentally alter the world's tenth largest river's entire hydrological and ecological system. Nevertheless, the consulting engineers conclude that the ecological impacts would not be severe. In

making such a conclusion the Report's authors have ignored their own fisheries biologists who warn:

> "The central problem with this evaluation and other studies of the Mekong River fisheries is a lack of data and information. These projects cannot be safely defined or adequately mitigated without a sound and reliable environmental data base." (p. vii)

The Mekong River is one of the world's most productive and diverse fisheries, providing the main source of protein for millions of people in the Mekong Basin. It is therefore extremely troubling that the fisheries consultants state:

> "It can be assumed that total impact on spawning habitats from inundation will be substantial. Significant loss of habitat and isolation of stocks from historic habitat will lead to lowered productivity, decreased biodiversity, increased incidence of rare and endangered species, and conversion of preferred fisheries to less desirable and less marketable species... all of the proposed dams, except for Khone Falls, will block fish migration. This one impact alone may cause a wholesale decline in the fishery throughout the lower Mekong River." (p. 88)

The fisheries consultants go on to say regarding the Khone Falls project (one of the "First Priority" projects for which construction is recommended):

> "It is questionable that after the minimum bypass flows through the falls are met to protect fish species, that the Khone Falls project could generate cost effective power. Khone Falls is an ecologically unique area that is essentially a microcosm of the entire lower Mekong River. It is a remarkable natural laboratory that would allow researchers to focus on one small area of the river, yet be able to describe much of the ecology of the fisheries throughout the entire river. Such a site is so rare in nature that every effort should be made to preserve all of Khone Falls from any development." (p. 90)

The fisheries consultants add that another "First Priority" project, Sambor, is:

> "located within a highly complex migration and rearing corridor and floodplain; perhaps the most productive area of the entire Mekong River. Because so many people capitalize on this highly diverse and productive fishery, it is a major component of Cambodia's economy.... The Sambor project will require an effective passage system for all migratory fish species to avoid or minimize significant impacts. Effective fish passage may be a remote possibility, requiring substantial research and development that may not prove fruitful." (p. 90)

The recommendation to go ahead with the dams also ignores the fisheries biologists' recommendation that two years worth of short-term studies are needed to "focus on specific issues and data gaps that are necessary to more accurately evaluate engineering criteria and design development." (p. vii) The consultants also recommend more detailed long-term studies which would take five to seven years. The biologists state:

> "Long-term studies are much more detailed and are intended to provide a background and environmental framework for sustainable development throughout the Mekong River watershed. This approach is relatively new, but is recognized in the international scientific community as the only plausible mechanism to develop resources and maintain biodiversity in a river basin." (p. vii)

c) Wetland losses claimed to be balanced.

The potentially devastating effects of these projects on wetland systems at the

dam sites and downstream are hardly acknowledged. Instead, although the Report states "data are not currently available to assess these effects" (p. 18), the authors make the unsubstantiated claim that losses can be mitigated by creating wetlands. This assertion contradicts experience with other large-scale dam projects and ignores the marginal results of wetland creation efforts worldwide.

d) No assessment of water quality impacts.

The Report does not even mention possible effects on water quality. Dam impacts on water quality are widely documented and include altered temperature, pH, salinity and dissolved oxygen, nutrient and sediment concentrations, with far-reaching impacts on aquatic biodiversity.

e) Downstream impacts ignored.

The Report includes no assessment of project impacts to the ecological and agricultural productivity of the Mekong Delta, despite the fact that the Delta plays an integral role in the Mekong River ecosystem and, in particular because of the large amount of rice grown on Delta wetlands, in Vietnam's economy.

f) Misleading representation of resettled populations.

The Report gives a false impression of precision in its resettlement estimates. For example, the Report estimates that Pa Mong would displace 23,261 people. Such precise estimates are misleading because of the considerable uncertainties in the methods used and because — as a mass of evidence from other projects shows — resolving these uncertainties invariably increases the number of people affected. Other problems with the Report's resettlement estimates include: population growth after 1993 is not listed; even the most accurate maps of reservoir sites used in the study have only five-meter contours in what are heavily vegetated areas, which is not precise enough to make accurate estimates; considerable populated areas adjacent to the reservoirs will be rendered uninhabitable; and impacts on populations downstream are excluded.

g) Impact on food supply ignored.

The fisheries report accompanying the main Report explains how Mekong River fish are the main source of protein for millions of people in Laos, Northeast Thailand, Cambodia, and the Delta area of Vietnam. By judging environmental impacts as "not severe," the authors of the Report ignore extremely the potentially extensive implications of mainstream development on food supply in the Mekong Basin.

5. FLAWED ECONOMIC ANALYSIS

a) Costs externalized.

The costs of environmental and social destruction caused by these projects have been largely excluded. These costs include loss of fisheries, deterioration of floodplain agriculture, increased estuarine salt water intrusion, increased water treatment costs, increased infrastructure costs due to eroding banks, and greater public health costs due to the increase of waterborne disease. The only environmental costs incorporated in the study are the three percent of project costs for "mitigation" of wetland losses and erosion control. The plan proposes payment of U.S. $5,500 to each displaced person, but makes no account for the loss to these people of sustainable agricultural and fisheries resources.

b) Benefits overestimated.

Electricity generation and revenues are based on assumptions that have considerable uncertainty. The analysis assumes electricity prices of U.S. $0.05 per kilowatt-hour or more, when in fact the targeted electricity buyer, the Electricity Generating Authority of Thailand, has recently signed electricity contracts setting prices at $0.043 per kWh or lower. Actual revenues generated by similar hydro projects in Thailand and countries with similar economic and ecological conditions should be used as a basis for actual likely generation.

Nowhere does the study clearly define "economic viability." Not until the final sections do the authors indicate that projects were considered "acceptable" if the estimated internal rate of return was greater than 11 percent.

The benefit-cost ratios included in the Report do not accurately reflect the true economics of these projects because, as noted above, many of the environmental and social costs were not included in cost estimates.

Moreover, World Bank studies show that large hydro projects typically surpass cost targets by 30 percent and exceed construction schedules by an average of 35 percent. Loan repayment schedules, however, are not allowed to slip. These findings cast further doubt on the questionable economics of the recommended projects.

6. INCOMPLETE TECHNICAL ANALYSIS

Major technical considerations that would affect the economics and feasibility of the projects were either ignored or dealt with superficially. For example the Report presents:

a) no assessment of the extent of geomorphic impacts on the downstream river channel, floodplains and estuary. Geomorphic changes, such as reduced

sediment deposition in the Delta or river bed degradation, can have massive consequences on ecosystems and economic infrastructure;

b) unrealistic assessment of reservoir sedimentation. The Report authors assume, without justification, that the unproven sediment bypass system will work and reservoir storage will be unimpaired. Existing sediment bypass systems similar to those proposed in the Report have achieved only marginal success; and

c) no analysis of increased flood hazards downstream due to acceleration of flood peaks, misoperation of projects, or dam failure.

7. UNJUSTIFIED RECOMMENDATIONS

In view of the potential for severe adverse social, environmental and economic impacts of major dam projects in the Mekong Basin, it is essential that a thorough independent and objective watershed analysis be carried out. Such an analysis would aim to develop a complete understanding of the hydrology, geomorphology, ecology and social geography of the river system, and would evaluate all existing beneficial uses of the river.

The history of dam construction worldwide over the last 50 years has shown that as we develop a better scientific understanding of river systems, we acquire a better appreciation of how high the true economic costs of massive interventions such as large dam projects are. The Mekong Secretariat should be aware that the promoters of dam projects have a vested interest in maintaining ignorance or misconceptions about key processes such as hydrology, sedimentation, fisheries, wetlands, and human interactions with rivers.

In summary, the Mekong Secretariat Report represents a transparent attempt to promote unwise large-scale development of the Mekong River. It appears that the Mekong Secretariat has simply repackaged a previously rejected development plan under the benign sounding "run-of-river" guise. The myopic perspective, flawed economic analysis, and unsupported conclusions and recommendations betray the pervasive bias of this study. The Report fails to present compelling reasons for developing any one of the proposed projects. Indeed, the most striking message of this Report is that the state of knowledge of the river and the planning approach employed in this study are wholly inadequate to address the complexity and immeasurable importance of the future management of the Mekong River Basin — an exceptionally valuable global resource upon which the livelihoods of millions of people depend.