

Paris Statement: Revisiting Sustainable Dam Planning and Operations

Prelude

At the UNESCO-sponsored international workshop on “*Challenges and Solutions for Planning and Operating Dams for Optimised Benefits*” held in Paris on 26-28 October 2010, participants generated a number of recommendations for accelerating progress toward sustainable dam planning and operations. This statement from the UNESCO expert group meeting calls for bold leadership from lending institutions, national governments, and dam owners and operators to substantially increase investment and facilitate real-world demonstration and implementation of sustainable dam siting, design, and operations.

Context

Dams have provided critically important socioeconomic benefits to billions of people, including electricity generation, flood control, and water supply for cities and food production. In many countries, dams have been powerful drivers of economic development, particularly in now-industrialized regions of the world.

The Millennium Declaration¹ and many other recent development reports document that much work remains to be done to improve the quality of life for billions of people that still do not have access to clean drinking water, electricity, or adequate food supplies. Dams can play an important role in helping to meet these needs, including producing electricity with generally low greenhouse gas emissions.

While the urgency of meeting development needs is clear, the imperative to do so in an environmentally sustainable manner is also widely recognized. As stated in the Millennium Declaration: “We must spare no effort to free all of humanity, and above all our children and grandchildren, from the threat of living on a planet irredeemably spoilt by human activities, and whose resources would no longer be sufficient for their needs.” The critical importance of *sustainable* development has been formally recognized as an international norm for two decades, beginning with the publication of “*Our Common Future*” by the Brundtland Commission² in 1987, but with philosophical roots that are much longer.

Unfortunately, the call for sustainability has been far stronger than its application in dam planning and operations. The World Commission on Dams Report³ of 2000 revealed serious and avoidable economic, social, and environmental impacts from dam development, and called for heightened attention to sustainability principles. However, the report’s call for more sustainable approaches to dam planning and management have rarely been translated into improved practices.

¹ United Nations *Millennium Declaration*, resolution adopted by the General Assembly on September 18, 2000

² *Our Common Future: Report of the World Commission on Environment and Development*. World Commission on Environment and Development, 1987. Published as Annex to General Assembly document A/42/427, [Development and International Co-operation: Environment](#) August 2, 1987.

³ *Dams and Development: A New Framework for Decision-Making*, Earthscan Publications, 2000.

A renewed commitment to such sustainable approaches is urgently needed because dam development, by altering key ecosystem processes such as river flows and services such as fisheries production, has already affected the livelihoods, food security and well-being of hundreds of millions of people.⁴ Thousands of new dams are planned or under construction, with considerable potential to bring benefits but also cause considerable harm. Similarly, tens of thousands of existing dams offer enormous potential to provide more optimal and sustainable benefits. The world's governments cannot hope to achieve poverty alleviation or other economic development targets, including the Millennium Development Goal of halving the proportion of people who suffer from extreme hunger and poverty by 2015,⁵ if new and existing dam projects do not adequately address the people and ecosystems that suffer from unintended collateral damage of major development projects.

This call for an exponential increase in investment in sustainability practices in dam planning and operations could not be more urgent given the realities of: (1) increasing evidence of climate change and associated hydrologic uncertainty; (2) increasing demand for water infrastructure development associated with population growth and changing consumption patterns; and (3) a pronounced shift in dam financing to sources that are not bound by the safeguards of institutions such as the World Bank and International Finance Corporation.

Workshop Findings

The workshop participants assert that a rich body of experience has emerged from around the world demonstrating the potential for more sustainable decisions on dam siting, design and operations to make them more compatible with the protection or restoration of social, cultural, and environmental values. This experience shows that serious social and environmental impacts caused by dam development are neither necessary nor justifiable. Dam development and operation can and must achieve new and balanced optima across economic, social, and environmental values and this goal is attainable, pragmatic, and economically feasible. However, the considerable inertia associated with "business as usual" will not be overcome without visionary investment by leading global institutions.

These workshop conclusions are based on many case studies, each enabled by leadership from key investors or implementing agencies. A number of these case studies were presented and reviewed in the UNESCO workshop, and have been summarized in both a technical summary document from the workshop and in the Appendix to this statement.

These successful cases embody a number of common elements. Importantly, they each recognize that an individual dam is only one component of a larger water management system, and that its impacts are not restricted to the dam's immediate footprint but, instead, affect entire river systems. As such, dams cannot be considered in isolation and solutions for improved dam planning and management must be pursued at the scale of integrated catchment management and associated biophysical

⁴ Richter, B.D., S. Postel, C. Revenga, T. Scudder, B. Lehner, A. Churchill, and M. Chow. Lost in development's shadow: the downstream human consequences of dams. 2010. *Water Alternatives* 3(2): 14-42.

⁵ United Nations. 2008. *The Millennium Development Goals Report 2008*. New York, NY: United Nations.

systems. This necessarily requires adoption of sustainability-based objectives that address not only benefits to target populations but also the consequences for river-dependent people and ecosystems. These examples demonstrate the feasibility of finding new streams of benefits for river dependent people and ecosystems.

Way Forward

Lending institutions, national governments, and other agencies must embrace leadership roles to facilitate broader application of sustainability principles in dam planning and operations. Such leadership must include the provision of exponentially greater levels of funding to enable both existing and new dam projects to implement sustainability practices in their planning, design, and operations. Identifying, refining and implementing these practices may entail greater uncertainty initially than individual agencies or countries are willing to bear. Until the practices are more widely demonstrated and accepted as common practice, there is an urgent need for “venture capital” from international agencies and lending institutions that can support the visionary, entrepreneurial, and potentially risky investments to design and test innovative approaches. Such upfront investment will be necessary to demonstrate the efficacy and benefits of sustainable approaches so that dam interests will embrace and more regularly apply these approaches.

Specifically, much greater investment and capacity building is needed in the following key areas:

- Demonstrating dam planning over broad geographies (i.e., river basin, national, regional scales) which identifies optimal locations for siting of new dams, as well as removal or rehabilitation of existing dams, for maximum benefits.⁶
- Exploring innovative alternatives for re-designing entire irrigation, power generation, and flood risk management systems to produce broader social and environmental benefits or reduce impacts.
- Underwriting risk to facilitate more sustainable modes of integrated dam and floodplain management.
- Evaluating alternative structural designs and operational plans for dams that can produce optimal performance across economic, social, and environmental values.
- Evaluating ecological responses to hydrologic and physical changes caused by dams and the restoration of benefits attainable through re-operation of existing dams.
- Analysing economic trade-offs between traditional benefits (water supply, electricity, flood control) and non-traditional benefits (i.e., ecosystem services, riverine food production, etc).
- Facilitating on-going global dialogues to ensure that lessons learned and breakthrough ideas are shared.
- Building capacity for sustainable dam development through both formal and informal curricula.

⁶ This is consistent with recently-adopted language in the Convention on Biological Diversity: “Urges Parties and other Governments to develop and implement national and regional action plans , strategic environmental assessments and to enforce existing legal measures in order to halt unsustainable use to promote the conservation and sustainable use of inland waters biodiversity especially to address inland waters over-extraction and fragmentation, including their impact on fisheries.”

Appendix – Highlights of Selected Case Studies

Sustainable Rivers Project, US Army Corps of Engineers: In collaboration with The Nature Conservancy, the Corps has supported comprehensive reviews of its existing dam operations in eight US river basins, facilitated scientific and stakeholder input into objective setting, and begun implementing strategically targeted dam releases to improve downstream environmental health while maintaining or enhancing project benefits such as flood protection, water supply provision, hydropower generation, and recreation. <http://www.nature.org/success/dams.html>

Department of Water Affairs and Forestry, South Africa: The Berg River Dam was the first in South Africa to incorporate structures that permit both low and high flow environmental releases to ensure that downstream river ecosystems and livelihoods were protected. The project increased water yield by 18% in the Western Cape Water Supply System, thereby enabling improved water distribution, including households lacking access to clean drinking water. http://en.wikipedia.org/wiki/Berg_River_Dam

Goulburn-Murray Water, Australia: Over the past decade, Goulburn-Murray Water, Australia's largest rural water corporation, has adapted its water resource management activities to address the impacts of drought and climate change while balancing the needs of consumptive users and the environment. For example, in the Loddon River system dam operation has specifically concentrated on the equal management of consumptive and environmental needs over the past four years. These efforts have succeeded even during intense water shortages. <http://www.g-mwater.com.au/>

Three Gorges Power Corporation, China: In collaboration with The Nature Conservancy, the Three Gorges Power Corporation has supported the formulation of feasibility studies for re-designing its four new dams on the Yangtze River to better optimize among hydropower, flood risk management, ecosystem protection, and food security (fisheries and agriculture) objectives. <http://www.nature.org/wherewework/asiapacific/china/work/yangtze.html>

Penobscot River Restoration Project, United States: A hydropower company (PPL Corporation), the Penobscot Indian Nation, seven conservation groups, and state and federal agencies are working together to restore 11 species of sea-run fish to the Penobscot River, while maintaining or increasing hydropower production. Successful implementation of the project will revive not only traditional fisheries but social, cultural and economic traditions of the second largest river in the northeastern US. http://www.penobscotriver.org/content/4003/The_Project/

Itaipu Dam and Reservoir, Brazil and Paraguay: Faced with major reservoir water quality problems due largely to agricultural nutrient run-off, the Itaipu Binational Company is investing in catchment sustainability. By promoting watershed restoration and soil management, and pursuing innovative approaches such as the conversion of animal waste nutrients into renewable sources of bio-mass energy, Itaipu has provided leadership in this vital aspect of reservoir sustainability. <http://www.itaipu.gov.br>