Dams: cornucopia or disaster?

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The current debate on dams has become dogmatic, sometimes emotional, and counter-productive. There is no single solution which could be valid for a heterogeneous world, in which there are large losses to society, and these social and environmental conditions, as well as institutional, technical and management capacities. There are also differing institutional and legal frameworks for managing water, and levels of development and available technology. A systematic approach is needed, where the main objectives of water developments are first identified. Solutions should then be case-specific, and these could vary from one location to another, or even at the same location over time.

The construction of large dams has been a controversial issue in recent years. Proponents of large dams claim that they deliver many benefits, among which are increased water availability for domestic and industrial purposes, increased agricultural production because of the availability of reliable irrigation water, protection from floods and droughts, generation of hydroelectric power, navigation, and overall regional development which improves the quality of life of the people, particularly, in some situations, women. They argue that like any other large infrastructure development or national policy, dams have both benefits and costs. However, overall benefits of dams far outweigh their total costs, and thus society as a whole is far better off with dams.

In contrast, opponents argue that dams bring catastrophic losses to society, and these social and environmental costs far outweigh benefits they may contribute. They claim that dams accentuate income distribution, as benefits go exclusively to the rich, and poor people slide further down the economic ladder. They claim that the main beneficiaries of dams are construction companies, consulting engineers and corrupt politicians, and government officials, who work in tandem to promote them. They argue that the poor do not benefit, but mostly suffer because of these structures.

Why this controversy?

In recent years, the views of the proponents and opponents of dams have become polarized. Scientifically and logically these two views cannot be correct. There has never been a real dialogue between the two camps, especially on a continuing basis. For example, during the Second World Water Forum, the pro-dam sessions discussed the benefits of dams, and the anti-dam sessions blamed all the societal ills on them. The proponents and opponents mostly did not attend each other’s sessions. Both sides went home thinking that the Forum basically agreed with their views. The situation was a little better at the Third World Water Forum in Kyoto, where the International Hydropower Association (IHA, a professional association promoting well planned hydro and dam development) and the International Rivers Network (IRN, a totally anti-dam organization) arranged a debate on the benefits and costs of large dams. By all accounts the pro-dam group won this debate with arguments based on observed facts and scientific analyses, and not on polemics or hypothesis. Dr. Cecilia Tortajada, for example, focused her presentation on the benefits and costs of the Atatürk dam. In contrast, the IRN’s generalized innuendos were extensively attacked by the audience for being highly economical with the truth. However, this type of interaction between the two opposing camps has been very rare. Such discussions and debates should be encouraged, since only through such debates, can a societal consensus on this complex issue be reached.

An important question that needs to be asked is why, in the 21st century, with major advances in science and technology, it is not possible to answer the comparatively simple question of what are the real costs and benefits of the dams, so that their net impacts and benefits can be determined authoritatively and comprehensively? The sterile debate on dams needs to be resolved conclusively once and for all, so that appropriate water development policies can be formulated and implemented, especially in developing countries, which will maximize their overall social welfare. Prima facie, it should not be a difficult question to answer, scientifically and objectively.

However, the world of development is complex, with scientific uncertainties, regional variations, vested interests, dogmatic views and hidden agendas. The issue of dams is no exception, and not surprisingly, it has fallen a victim to this complex interaction of forces.

First should come a caveat. Neither this author nor the Third World Centre for Water Management makes a living either in promoting or opposing dams. The activities of the Centre, which can be remotely considered to be dam-related, have never exceeded 10 per cent of its budget: mostly they are around 5 per cent. Thus, even if all the dam-related activities of the Centre disappeared, it would have no material impact on this institution.

There are many reasons which have fuelled the current controversy, some of which are real, but others are artificial and manufactured. The main reasons for this controversy will be briefly discussed next.

Vested interests

There is no question that there are many people who have a vested interest in this debate, irrespective of which side they are on. Much has been written and said about the construction and consulting companies that are associated with the planning, design and construction of dams, and accusations have been made about their financial contributions to political parties, who are the final arbiters of making decisions in democratic societies. There is no question that construction and development of large dams is a capital-intensive activity, and many people benefit economically from this process. The dam lobby is often portrayed by the anti-dam lobby as being interested in the construction of dams because of the financial benefits they obtain from their planning and construction processes. Unfortunately, the voices of many sectors of society who benefit from dams, like farmers and others who use the hydropower generated from dams, are seldom heard in this debate.

In contrast, those NGOs which are against dams
(there are numerous pro-dam NGOs as well, but they
generally are not as communicative through the media
as the anti-dam NGOs, and are thus not as visible)
mostly like to portray themselves as little ‘David’s
who are pitted against well-heeled ‘Goliaths’ of the
pro-dam lobby, ‘connected to the corridors of power’.
There is no question that there are many grassroots
NGOs who have made a useful contribution in high-
lighting the plights of the people who have to be prop-
erly resettled as a result of the construction of large
development projects (dams, new towns, airports,
highways and so on.) However, many of the main
activist NGOs in the anti-dam lobby have now become
financially powerful, mainly from support from sever-
al international organizations, primarily from the
USA. Their self-portrayal as small or weak organiza-
tions is more for media and publicity purposes.

In the past, involuntary resettlement was regarded as
the price of progress, and those who had to move were
not always properly compensated for their forced re-
location. By making the plights of displaced people a
major political issue, the activist NGOs have played a
very important role which needs to be acknowledged.

The current power of NGOs can be realized from
recent research by the Johns Hopkins Centre for Civil
Society [1999]. It indicates that, globally, the non-
profit sector (excluding religious organizations) has
now become a $1.1 trillion industry, employing some
19 million fully paid employees. This already repre-
sents the world’s eighth largest economy. As a global
assessment of NGOs, carried out by a reputable NGO,
SustainAbility [2003], has pointed out that NGOs
“that once largely opposed – and operated outside –
the system” are becoming integral to the system. They
are no longer small.

The international activist anti-dam NGOs are at pres-
tent no exception to the above findings. They have
become adept at playing the system to promote their
own agendas, at least in terms of obtaining funds from
various lending institutions, and generating extensive
media publicity for their causes.

The anti-dam lobby has also become financially
powerful. Anecdotal evidence can confirm this: the
only institution concerned with the dams debate that
participated in the Third World Water Forum in Kyoto
which brought its own full camera team, was an NGO,
belonging to the anti-dam lobby. In fact, it should be
realized that the pro-dam and the international anti-
dam lobby are now both well financed: members of
both the groups are now gold cardholders of frequent
lier clubs of major airlines.

Sebastian Mallaby [2004*], columnist and editorial
writer for The Washington Post, reviewed two dam pro-
jects that have been consistently opposed by the activists:
a dam on the Nile at Bujagali, Uganda, and the Qinghai
project in Tibet, China. An abridged version of his recent
article on this subject appears in this issue (see p55).

There is no question that there are extremists in both
the pro-dam and the anti-dam lobbies, who have their
own vested interests and hidden agendas, and thus
their views and statements need to be carefully
analysed in terms of their accuracies, generalizations
based on limited or no facts, and innuendos. Truth has
often become a casualty in this bitter fight.

Complex issues with no single answer

The sweeping generalizations of the two groups most-
ly do not survive scrutiny. In the cacophony of argu-
ments, what is often forgotten is that the issues
involved are complex, and there is no single answer
which could cover all the dams of the world, con-
structed or proposed, irrespective of their locations
and qualities. Nor can one view be everlasting in any
country; it could change with time.

What has been forgotten in the current debate on
dams is that neither the statement ‘all dams are good’,
nor ‘all dams are bad and thus no new ones should be
constructed’ are correct. Depending on the criteria
of ‘good’ selected, it has to be admitted that there are
both good and bad dams. Furthermore, their needs
vary from one country to another, and often from one
region to another, especially within large countries
such as Brazil, China or India, depending on climatic,
economic, social and environmental conditions.

Furthermore, countries are at different stages of eco-
omic development, and thus their needs for dams also
vary, depending on their stages of development.

Also, an industrialized country like the USA has
developed nearly all of its best and most economic
dam sites. In contrast, much of the potential in sub-
Saharan Africa (with the exception of South Africa)
has yet to be tapped. Equally, a country like Nepal
has a similar amount of hydropower potential as that
already developed in the USA. However, Nepal has
developed only about 4 per cent of its hydro potential.
Thus, what may appear to be a logical and efficient
solution for the USA at present is unlikely to be the
best and the most suitable for Nepalese conditions.

In the area of dams, like in most other complex
development-related issues, there is simply not ‘one
size that fits all’. Both the proponents and opponents
of the dam debate have ignored this simple fact.

Climatic differences

A major technical issue that has been totally ignored
in the current debate is the very significant climatic
differences between developed and developing coun-
tries, especially in terms of rainfall distribution over
the year. This is an important issue, because storage is
more important for developing countries, compared
with developed countries.

Very few development experts, including water
experts, have appreciated the importance and rele-
vance of climate patterns for economic development.
This lack of understanding is especially difficult to
understand in the case of the water experts, since one
of their main concerns is precipitation. Even as early
as 1951, Galbraith, an eminent economist, noted that
if “one marks off a belt a couple of thousand miles in
width encircling the earth at the equator, one finds
within it no developed countries” [Galbraith, 1951*].
A decade later, a United Nations report [1984] noted that
if the industrialized countries are marked on a
map, they will be seen to be located in the temperate
zone. In other words, the developed countries are
located in temperate zones, but developing countries
are found in the tropical and sub-tropical climates
[Biswas, 1984*].

Another important issue that has received scant
attention is the distribution of rainfall in the tropics
and semi-tropics compared with the temperate zones.
The annual rainfall averages mask the very significant
differences in the distribution of the rainfall patterns
between developed and developing countries.

If the annual average rainfalls are compared between
three cities, two in developing countries (Sokoto on
the Southern border of the Sahel in Nigeria and Delhi,
India) and London, UK, they are somewhat similar: 57
cm, 71 cm and 67 cm respectively. However, if their
distributions over the year are considered, the patterns are totally different. For example, London, a temperate zone city, can be characterized by a low but reasonably uniform monthly rainfall rate over the year, varying from a high of 61 mm in October to a minimum of 35 mm in April. Similarly, rainfall retained in the soil is reasonably uniform.

However, the rainfall pattern is very different for Sokoto. Nearly 36 per cent of annual average rainfall occurs during the month of August alone. More than 92 per cent of average rainfall occurs within the four-month period of June to September. There is no rainfall during the five months of November to March, and very little in April and October (10 and 13 mm, respectively). Not surprisingly, Sokoto has a significantly lower rainfall retention rate in the soil throughout the year, compared with London. In fact, the highest rainfall retention rate in the soil in Sokoto (September) is 42 per cent lower than the lowest retention rate in London that occurs in August. Thus, not only do water management strategies for London and Sokoto have to be very different, even though their annual average rainfalls are somewhat similar, but also irrigation water requirements for crops are very different. Sokoto cannot manage without storing water during the rainy months, which can then be released as required over the year during the dry months. In contrast, in the case of climatic regimes like London, with its more uniform precipitation and high soil moisture retaining rates, needs for irrigation water are significantly lower.

Even the monthly rainfall figures may lead to a misleading comparison. For example, the average number of rainy days in New Delhi is about 40 per year. During the rainy days, rainfall does not occur uniformly over a period of 24 hours. It has been estimated that Delhi receives its annual rainfall in less than 80 hours, though these hours are not necessarily consecutive.

The rainiest town of India, Cherrapunji, receives its annual rainfall of 10 820 mm during the southwest monsoon, between June and August. This immense rainfall occurs in about 120 hours. Because this vast quantity of water cannot be properly stored, Cherrapunji, in spite of its very substantial rainfall, faces a water problem during the dry months of the year.

Overall, India receives its annual rainfall in less than 100 hours. Because of this very skewed pattern of rainfall distribution, water management strategies in India have to differ compared with those of countries in temperate climates where rainfall is significantly more regular and predictable.

Because of the very high seasonality of rainfall in some developing countries, the critical issue is how to store such immense quantities of rainfall over very short periods, so that they can be used over the entire year. In addition, the fluctuations in annual rainfall are also high in such countries, which means that the incidences of floods and droughts are much more frequent than in the temperate zone areas. Thus, for countries of the developing world in the tropical and subtropical regions, what is needed is cost-effective, socially acceptable and environmentally sound solutions for storing large volumes of precipitation over a comparatively short period, so that the stored water can be used during the dry periods each year, and also inter-annually during droughts. Accordingly, the technical complexities of water management in the developing countries of the tropics and sub-tropics are significantly more complex than those in the developed countries in temperate zones. This simple fact is generally ignored in the debate on dams.

Because of climatic differences, developing countries must consider all alternatives available for storing water during the periods of intense rainfall, so that these can be made available whenever needed to satisfy human needs. The alternatives available to smooth out these wide inter- and intra-annual fluctuations in rainfall include dams (small, medium and large), groundwater recharge and storage, as well as rainwater harvesting.

The sad part of the current debate on dams is that it has become increasingly dogmatic and emotional. Many times participants may hear what their opponents are saying, but they do not listen. The alternatives are not ‘either/or’, but rather what alternatives will work best, where, and in which conditions. The focus of the discussions should be on how best to provide the water needs of all segments of the society cost-effectively, efficiently and reliably, on a long-term basis.

For the most part, the current debate on ‘dams or no dams’ is an irrelevant one. It is far more important to assess what are the societal needs for water, and then take steps to meet them in the best and most socially acceptable way. Depending on the prevailing conditions of the location under consideration, the most efficient alternative may be the construction of a large dam, or rainwater harvesting, or a mixture of these two, and/or other solutions. There is no single solution to fit all climatic, physical, social, economic and environmental conditions, for all countries of the world and for all periods in history.

It should be realized that in the real world of water resources management, small may not always be beautiful. Equally, large could be sometimes magnificent, but on other occasions it could be a disaster. Each alternative should be judged on its own merit and within the context in which it is to be applied. Once the right solution has been identified for the specific location in question, the scheme should be planned, designed, implemented and managed as efficiently, equitably and quickly as possible.

**Absence of post-construction assessment of dams**

A major reason why the current non-productive debate on dams has thrived is the absence of objective and detailed ex-post analyses of the physical, economic, social and environmental impacts of large dams, five, ten or fifteen years after their construction. At present, thousands of studies exist on environmental impact assessments (EIA) of large dams, some of which are very good, but others are not worth the paper on which they are written. It should be realized that all EIAs are invariably predictions, and until the dams become operational, their impacts (types, magnitudes, and spatial and temporal distributions) are not certain, and thus remain in the realm of hypotheses. Even the very best assessment can perhaps forecast only about 70-75 per cent of the identified impacts accurately in terms of time, space and magnitude. It is not possible to identify 25-30 per cent of the impacts that will actually occur after the dams have become operational. For an average EIA of a large dam, some 40-50 per cent of its impacts (positive or negative) are not properly identified.

Assessments must include both positive and negative impacts. A two-pronged approach is needed which will include identification and assessment of positive benefits and recommendations of measures which will maximize them, as well as an assessment of the negative impacts and policy actions that should be taken to
minimize them. Only such a comprehensive approach will ensure that the net benefits for society can be maximized. Exclusive consideration of negative impacts, as is widely practiced at present, is a fundamentally flawed procedure, which will seldom contribute to the maximization of overall benefits to any society. Such practices will only give information on part of the story, which will not provide a good, logical and scientific basis for decision-making.

While thousands of studies are available on EIAs of large dams, which were prepared prior to their construction, assessment of actual impacts of large dams five, ten or fifteen years after their construction, are very few. Some have now claimed that the World Commission on Dams (WCD) prepared numerous such assessments of large dams from different parts of the world. Unfortunately, most of these analyses are superficial and often skewed to prove the dogmatic and one-sided views of the authors who prepared the studies. They can be considered to be neither objective nor comprehensive. It is possible that among these assessments, there are a few good case studies. Unfortunately, however, no rigorous peer reviews of these case studies were ever carried out. Consequently, if there are any valuable cases among these reports, they remain very well hidden. As regards, the assessments carried out for the WCD, if one of my graduate students had carried out these studies, I would have instructed him/her to redo them again properly, objectively and comprehensively. The authors of four of these case studies submitted their papers for possible publication in the International Journal of Water Resources Development. All four papers were rejected by the peer-reviewers for their poor quality. Thus, the WCD case studies of assessments of the real impacts of large dams from different parts of the world are of very limited use to the water and development professions, irrespective of the current rhetoric of their supporters.

Because of this unfortunate current situation, the Third World Centre for Water Management has initiated a comprehensive impact assessment (positive and negative) of three large dams that have been operational for a minimum of 10 years. These are: Aswan High dam in Egypt, Atatürk dam in Turkey, and Bhakra-Nangal dam in India. This analysis will also include the perceptions of the people in the areas that were affected by the dams, both beneficiaries as well as those who had to pay some costs, for example, people who had to be resettled. The analysis of the Bhakra-Nangal project is now complete, and it will shortly be published as a book by Oxford University Press. The results of analyses of the overall impacts of the Atatürk dam and the Aswan High dam will start becoming available from mid-2005. The data collected will be available for scrutiny, and the analyses are being based only on facts, and not on dogmas, biases or hypothesis.

**World Commission on Dams**

Much has been said and written on the World Commission on Dams. The views on the process and the report have ranged from admiration to outright rejection. An objective assessment of the process and an assessment of the real impacts (positive and negative) of the WCD have yet to be made. However, some comments on the Commission are appropriate here.

In terms of history, in April 1997, the World Bank and the World Conservation Union (IUCN) convened a meeting at the IUCN headquarters in Gland, Switzerland, ostensibly to discuss an internal World Bank review on large dams and the need for a more detailed study. This review concluded that “the finding that 37 of the large dams in this review (74 per cent) are acceptable and potentially acceptable, suggests that, overall, most large dams were justified” [World Bank, 1996].

The participants at this meeting were arbitrarily chosen by the two sponsors. The only consideration appears to have been that the participants came from a diverse group of interests. However, why a specific person or institution was invited and not another from the same interest group, still remains a mystery. According to the list of participants available, 38 people attended this workshop, of which 12 (nearly one-third) represented the two sponsors alone.

This group unilaterally decided to establish an international commission to review the effectiveness of large dams and develop standards, criteria and guidelines. The group, which was originally selected without much apparent logic, then became a self-appointed ‘reference group’; some members of the World Bank and IUCN formed an Interim Working Group (IWG). The result was the World Commission on Dams, the ‘mandate’ of which, according to its own pronouncement, was a report that would be submitted to the two sponsors, reference group, and the ‘international community’, (which was not defined).

The Commissioners and its Chairman were selected by an opaque process. Why and according to which criteria each member was selected still remains a mystery. As one who has been associated with several World Commissions before, it is useful to compare the WCD process with two other earlier commissions, the Independent Commission on International Development Issues (the Brundtland Commission) and the World Commission on Environment and Development (the Brundtland Commission).

The Brundtland Commission owes its formation to the personal interest of Robert McNamara, then President of the World Bank, and it had the moral backing of the United Nations. Unlike WCD, this Commission did not pretend to be representative of all stakeholders. It consisted of a group of eminent persons from both the North and the South, and was chaired by a very well known and well respected international figure, former German Chancellor Willy Brandt of Germany. Individually, the members of this Commission were all well respected international figures, who, because of their own accomplishments in various areas, gave credibility to the Brundtland Commission, which WCD lacked.

The Brundtland Commission had an even better mandate compared with the Brundtland Commission, since this initiative came directly from the Secretary-General of the United Nations, and the UN General Assembly unanimously adopted a resolution in 1983 to establish the Commission. It was chaired by the former Prime Minister of Norway, Gro Harlem Brundtland, also a well known development personality.

In retrospect, both these Commissions had very modest impacts on the global scene. It is important to view WCD in an overall perspective of global development-related events of the last 25 years, especially because of the highly exaggerated claims that were made on the effectiveness and impacts of WCD by its supporters. Unfortunately, it was neither a unique exercise, nor a totally new initiative, but in fact continuation of a well established trend, but with a somewhat dubious origin.
There are some fundamental differences between the three commissions referred to above. Among these differences are the following:

- The Brandt and the Brundtland Commissions both had mandating authorities, the Brandtland more than the Brandt. In contrast, the WCD had a mandate, but there was no mandating authority. It was basically only 26 individuals (excluding the World Bank and the IUCN staff members) who took upon themselves to start a Commission. Some of the participants later decided not to become actively with the Commission itself. Because the WCD had no mandating authority, its recommendations have not been binding to any party. Even one of its main godfathers, the World Bank, after initially making positive comments on the WCD process, now seems to have very little interest in changing its policies to reflect the recommendations of the WCD report.

- Irrespective of the claims by WCD itself, and also by its supporters, that the process used was transparent, democratic and unique, the author’s limited interactions with the Secretariat were to the contrary: it was somewhat opaque, secretive and autocratic.

- The legitimate question that has not been asked so far, and has certainly not been answered, is, who or what gave the arbitrarily selected 26 people and 12 staff members of the World Bank and the IUCN that were present at the Gland meeting the right to set up an international commission, and give it an ‘international’ mandate? How, by whom, and through what processes WCD was made representative so that it earned the right to speak for all the stakeholders?

- According to any logical criteria, WCD was not a truly representative body of its stakeholders, irrespective of the claims to the contrary. For example, WCD had NGOs who were speaking in the name of indigenous and poor people who would be displaced as a result of the construction of the dams. However, they did not consider having NGOs representing farmers, whose agricultural production would increase because of irrigation provided by the dams. As a general rule, the number of farmers who are affected by a dam is far higher than the number of people who are displaced. It is a strange concept of democracy, transparency and representation of all the stakeholders, when the largest stakeholder, deliberately or otherwise, was not invited to participate. Nor were those who will receive assured water supply, which they did not have earlier, invited to this group. Presumably they are stakeholders as well. Democracy means consideration of pluralism, and pluralism cannot be one-sided, as was the case for WCD.

- Because the process used by WCD was seriously flawed, not surprisingly its report has had very modest impacts, if any, so far on the countries that are building dams, or on the international funding institutions that are financing dams. The real question that has yet to be asked, let alone answered, is, if the WCD had not been established, would the world have been any different now, or 10 years from now? The author’s personal feeling is that it would not have mattered very much one way or another.

Conclusions

The current controversy on dams is a dogmatic and emotional debate. To the extent that it brings new issues which need to be carefully considered and addressed, this debate should be welcomed. To the extent that it is a debate between vested interests, any progress resulting from it is likely to be somewhat limited, or even futile. The debate needs to be re-focused. What is necessary to consider is the overall architecture of the water development system which will achieve the objectives that societies in developing countries desperately need: poverty alleviation, regional income redistribution and environmental conservation. Within this overall architecture, what is imperative is how best to supply the water needs of society, cost-effectively, equitably and in a timely and environmentally friendly manner. The world of development is complex, and there will always be instances of tradeoffs resulting from a major policy, programme or project. These tradeoffs should be considered objectively, accurately, honestly, sensitively and in a socially acceptable manner. Within such an overall framework, the best solution for water development must be sought for each specific case. This may warrant construction of a dam in a specific location, but it may equally require another solution. Until the local needs, conditions and requirements have been carefully assessed and considered, a solution of ‘dam’ or ‘no dam’ should not be imposed a priori, especially by people who are outside the region.

In the final analysis, alternatives selected may require the construction of properly planned and designed dams, which could be large, medium or small, or rainwater harvesting, or any number of appropriate alternatives. The solutions selected must not be dogmatic, and should always reflect the needs of the areas under consideration. In terms of water development, it should be remembered that small is not always beautiful and large is not always magnificent. Solutions must be specifically designed to solve the problems encountered. The current emotional debate on dams is somewhat akin to a solution-in-search-of-a-problem approach, where the a priori solution becomes ‘dams or no dams’, depending on the lobbies concerned. Such process is scientifically unacceptable, socially disruptive and environmentally dangerous.

No single pattern of water development is the most appropriate for all the countries at any specific time. Countries are at different stage of development; their economic and management capacities are not identical; climatic, physical and environmental conditions are often dissimilar; institutional and legal frameworks used for water management differ; and, their social and cultural conditions vary significantly.

In addition, the world is changing very fast, and its water management concepts and practices must change as well. The world of water management is likely to change more during the next 20 years, compared with the past 2000 years. Thus, past experiences can only be of limited help in water management, especially as these changes, unlike in the past, will come from outside the water sector. Among these driving and overarching forces are concurrent rapid and extensive urbanization and ruralization in developing countries, accelerated globalization, advances in technology like biotechnology and desalination, and a continuing communication and information revolution. All these and other associated changes will affect water management through myriads of pathways, some of which can be anticipated at present, but others are still most unpredictable and so little likely to be somewhat unexpected. In this vastly changing complex world of water management, there should be no room for sterile debates on ‘dam or no dam’.
The main question facing the developing countries of Asia, Africa and Latin America is not whether large dams have an important role to play in the future, but rather how best we can plan, design and construct them where they are needed so that their performances in economic, social and environmental terms can be maximized and adverse impacts can be minimized. Simultaneously we must ensure that those who may have to pay the costs of their implementation are made their direct beneficiaries. It will not be an easy task to accomplish, but it is nevertheless essential to do so. One can only recall the salutary words of George Bernard Shaw: “Some men see the world as it is and never ask why; I dream of things that never were and ask why not”.

References

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