



CSIRO LAND AND WATER
PHOTOGRAPHY FROM CSIRO



ICOLD

The role of infrastructures meeting needs in the Basins

Enrique Cifres, Dr.Eng

Chairman of ICOLD Tech.Committee

“Role of dams in the development of River Basins”



- Today the International Commission on Large Dams (ICOLD-CIGB) remains the world's **leading non-governmental international organisation** that provides a forum for the exchange of knowledge and experience in dam engineering.

- ICOLD is now focused on the **dissemination** of dam technology for the betterment of the developing countries.

- ICOLD leads the profession in setting standards and guidelines to ensure that dams are built and operated **safely, efficiently, economically, and are environmentally sustainable and socially equitable**



ICOLD was established in Paris on 6th July 1928.

- 88 member countries
- >10,000 individual members
- over 500 international experts in 24 Technical Committees
- >140 publications

<80-90's



Structural measures

<80-90's



Structural measures

90's



Non structural measures
Just management

Las presas más conflictivas del mundo

Presas en el mundo

+ Existentes	800.000	Cada año se ven desplazadas cuatro millones de personas
De grandes dimensiones	45.000	
+ En construcción	1.600	

COLOMBIA

+ **Embera-Katio**. Los indígenas no aceptan las indemnizaciones. Consideran sagradas las tierras que ha comenzado a anegar la presa.

INDIA

+ **Sardar Sarovar**. 43.000 personas desplazadas.
+ Otras presas: **Telegu Ganga, Chamera, Sharavathi**.

CHINA

+ **Tres Gargantas** (3 millones de desplazados)

BANGLADESH Desplazados

+ **Chittagong Hill** 18.000
+ **Kaptai Dam** 150.000

CHILE

+ **Bio-Bio**. Endesa. España ha asumido la continuación de las obras rechazadas por los indígenas.

SENEGAL

+ **Diama**
+ **Manantali**

UGANDA

Presas previstas: Hm³

+ Kalagala	450
+ Murchison Falls	642
+ Bujagali	320
+ Ayago S.	234
+ Ayago N.	304
+ Kamdin	180

NEPAL

+ 3 presas proyectadas (**Pancheswore, Karnali y West Seti**) para exportar electricidad a India. Serán desplazadas 161.000 personas.

SRI LANKA

+ **Mahaweli** (700.000 personas desplazadas)
+ **Victoria** (en proyecto)

ARGENTINA

+ **Yaciretá**. Presa en el Paraná. Las autoridades pretenden subir la cota de 70 a 83 m para almacenar 21.000 Hm³. Supone desplazar a 10.000 familias

PAKISTÁN

+ **Kalabag** (río Tarbela), en construcción.

BRASIL

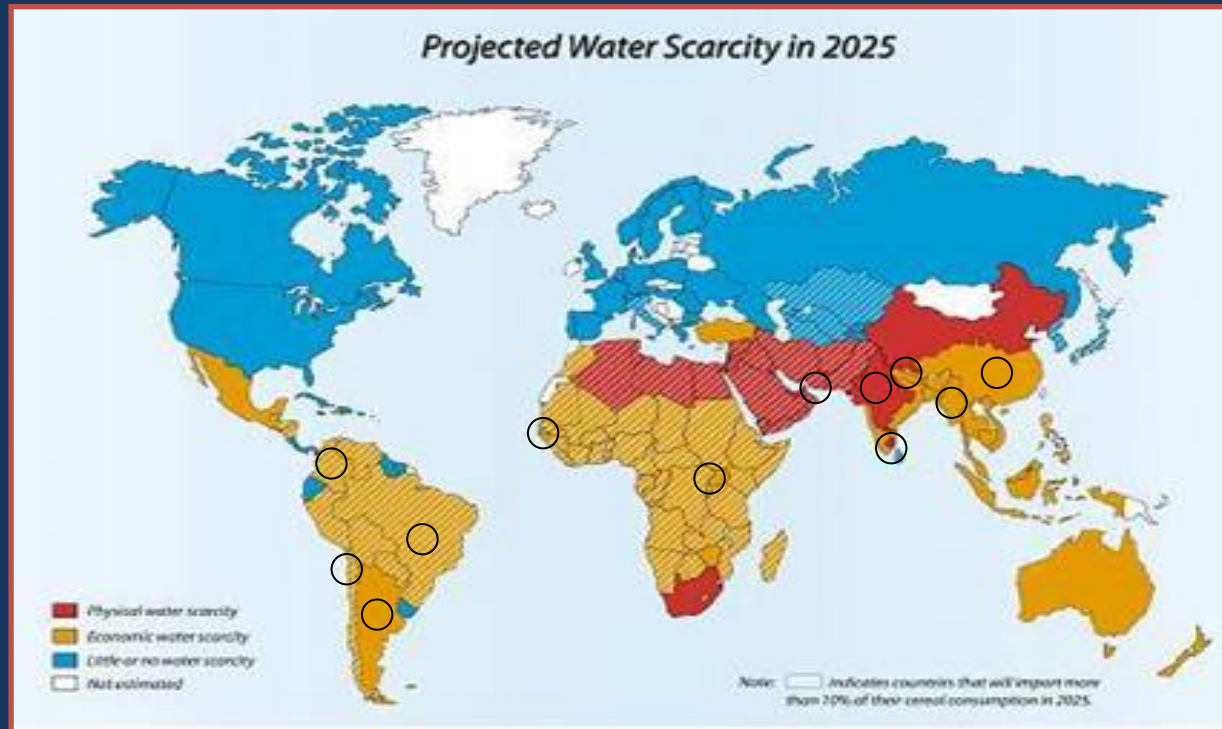
+ **Tucuruí**. 40.000 personas desplazadas

Fuente: Comisión Mundial de Presas.

EL PAÍS



Year 2000: WCD MDG



Year 2003: II-WWF Kyoto

<80-90's



Structural measures

90's



Non structural measures
Just management

Late 90's and XXIst cent



Both plus proactive strategies

Duality between developed and developing countries' context.

Dams can play a decisive role on the development of the yet unlucky communities which are hoping to reach better living standards in developing countries.

Perhaps this role could be similar to that that dams played in the past in already developed countries. Opportunity to improve projects.



Developed context



- Lot of dams
- Few more sites for reliable new dams
- Progress no longer depends on dams
- Population and water demand are stable
- Ability to un-couple economic growth from water resource utilization.
- National interest has been replaced by individual comfort.
- Constitute wealthy communities that can afford to pay more for food.
- Many of their major cities are settled by lakes or to the sea, or at least enjoy wetter conditions and less severe droughts.
- Furthermore the cost of desalination of sea waters is now competitive with fresh water resources.

Underdeveloped context

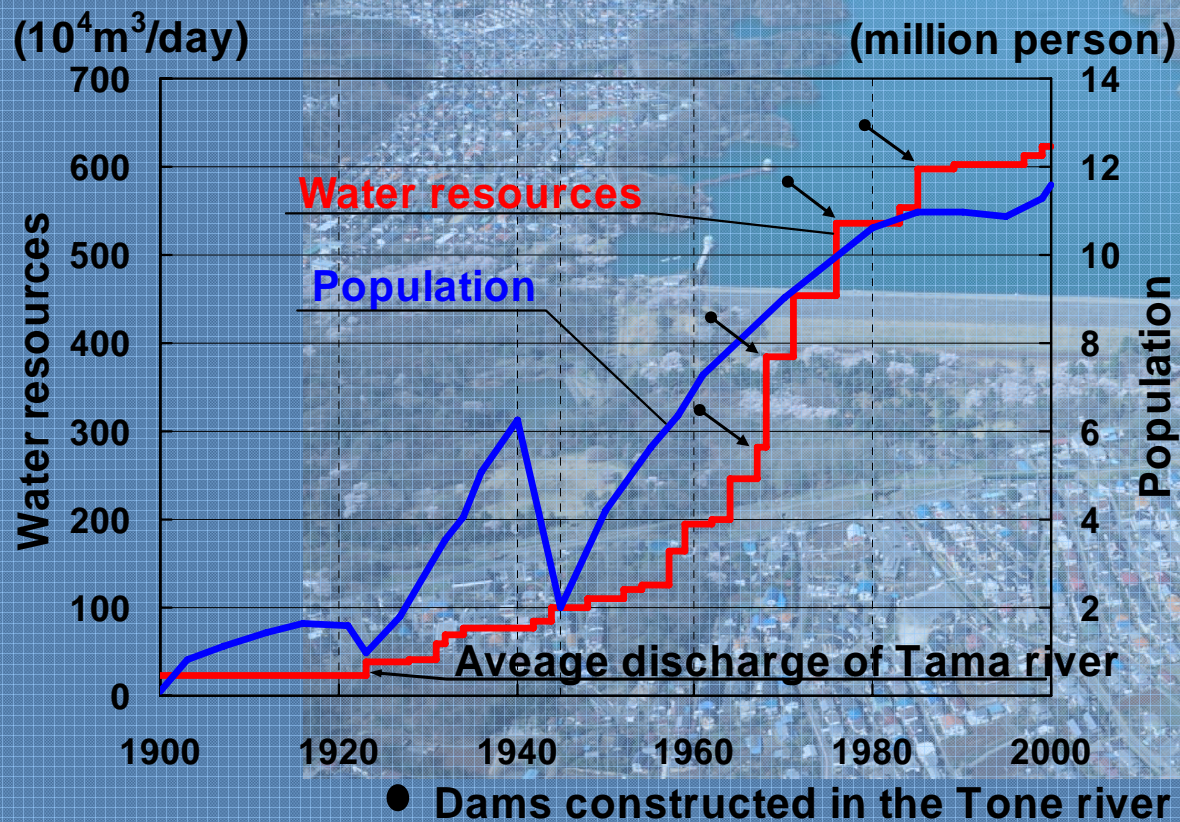
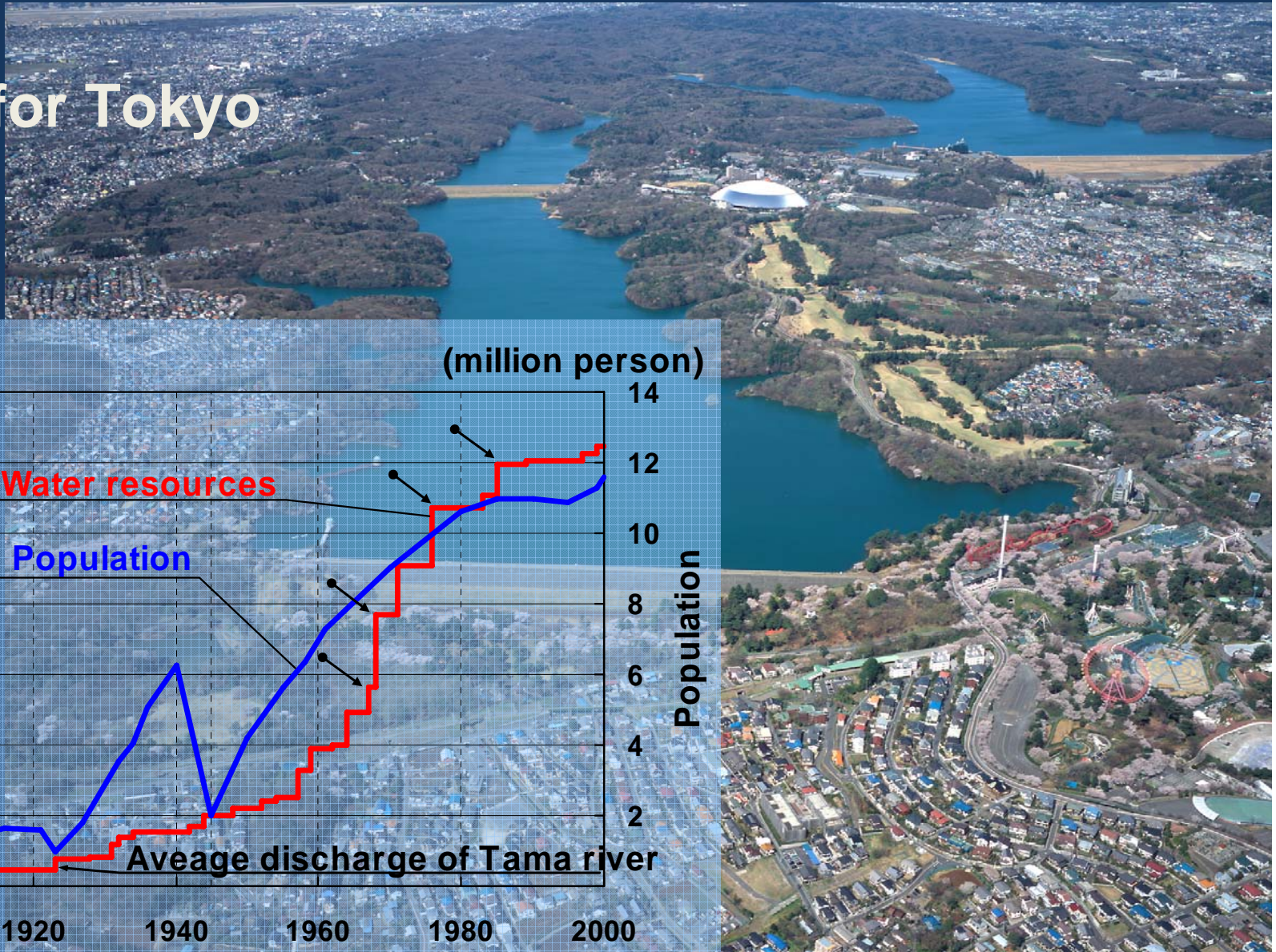


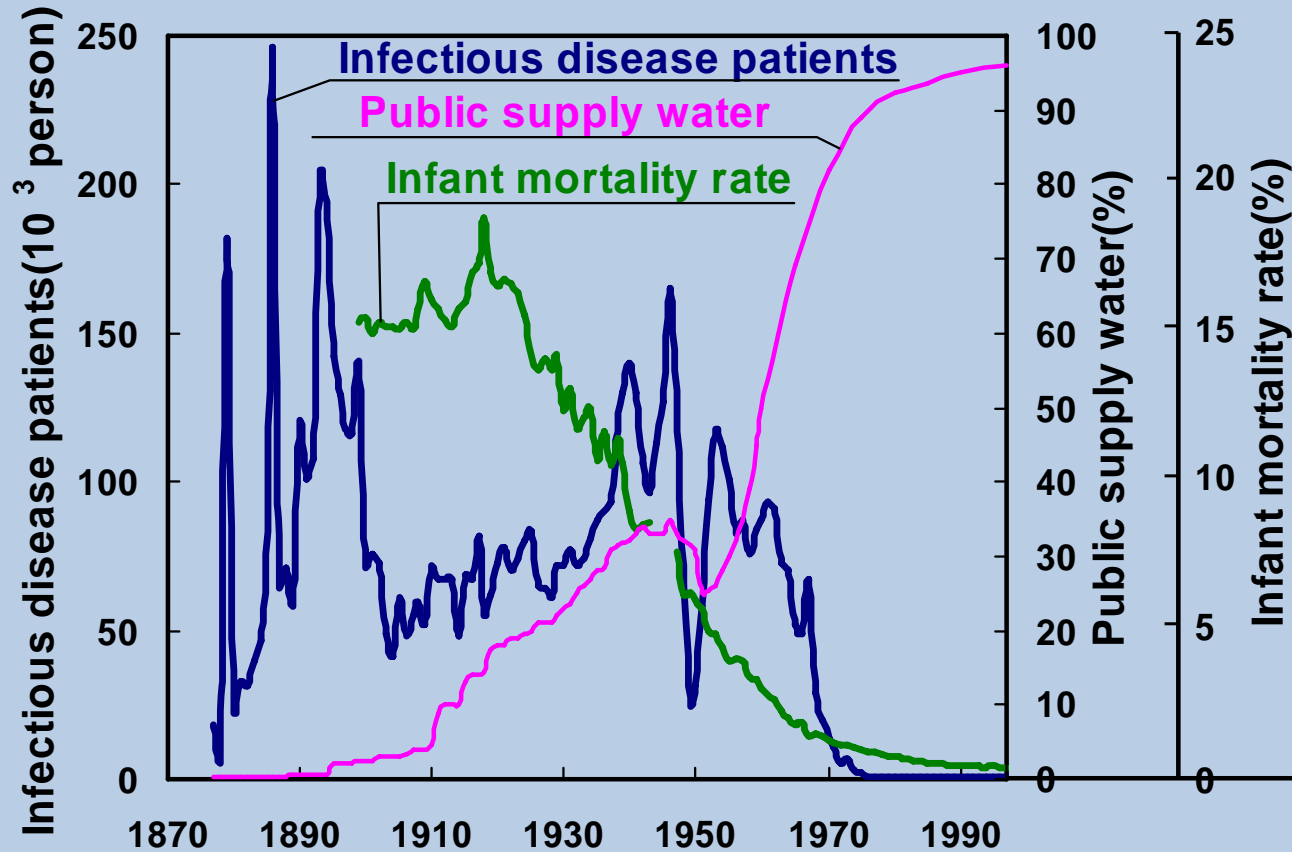
- Lack of infrastructures
- Population and increased demand growth .
- Water demand would increase even quicker.
- The access to clean water and sanitation services, adequate health care and education and other fundamental requirements for a satisfactory quality of life are already lacking.





Water for Tokyo





Organización
Mundial de la Salud

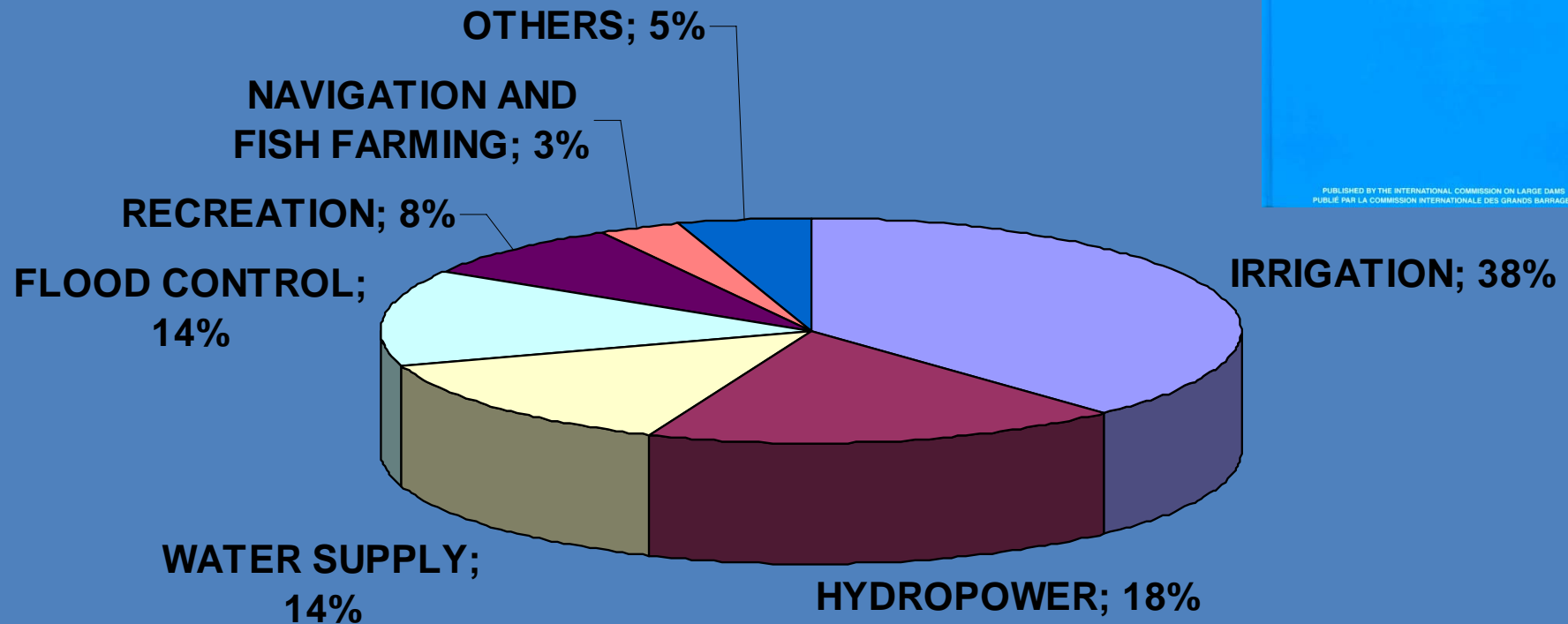
:1,8 millones de niños de todo el mundo (900.000 en el África subsahariana) mueren a consecuencia directa de diarreas y otras enfermedades ocasionadas por aguas contaminadas y por un saneamiento insuficiente.

DAMS'S PURPOSE

WORLD REGISTER OF DAMS
REGISTRE MONDIAL DES BARRAGES
2003



PUBLISHED BY THE INTERNATIONAL COMMISSION ON LARGE DAMS
PUBLIÉ PAR LA COMMISSION INTERNATIONALE DES GRANDS BARRAGES



50.000 LARGE DAMS IN OPERATION

SMALL DAMS : 1 MILLION

THE TOTAL RESERVOIR CAPACITY: 8,300 KM³



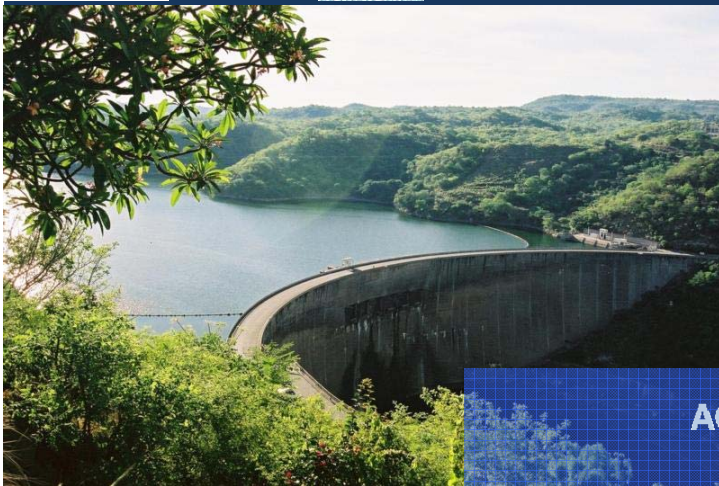
ROLE OF DAMS

- IRRIGATION: 17 % ARABLE LAND
→ 40% OF TOTAL WORLD CROPS.

- DRINKING WATER SUPPLY

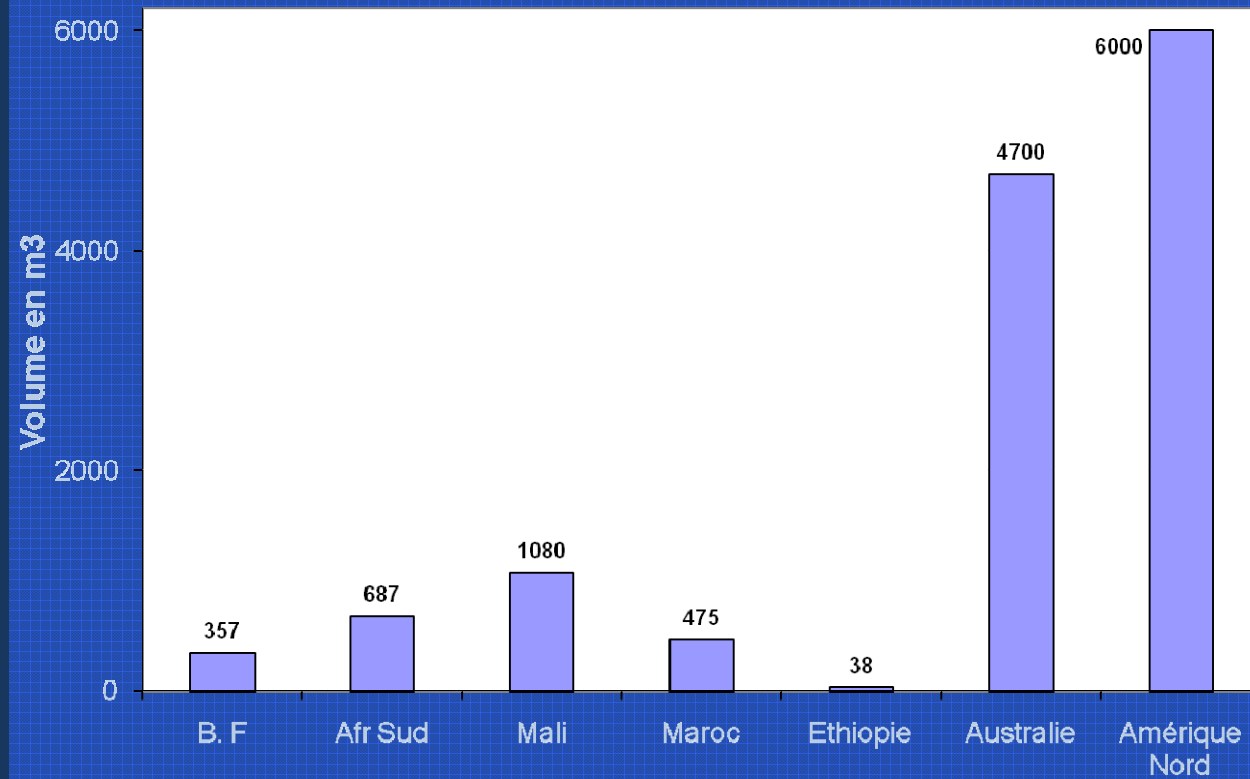
- FLOOD MITIGATION.

- HYDROPOWER: 20% ELECTRICITY



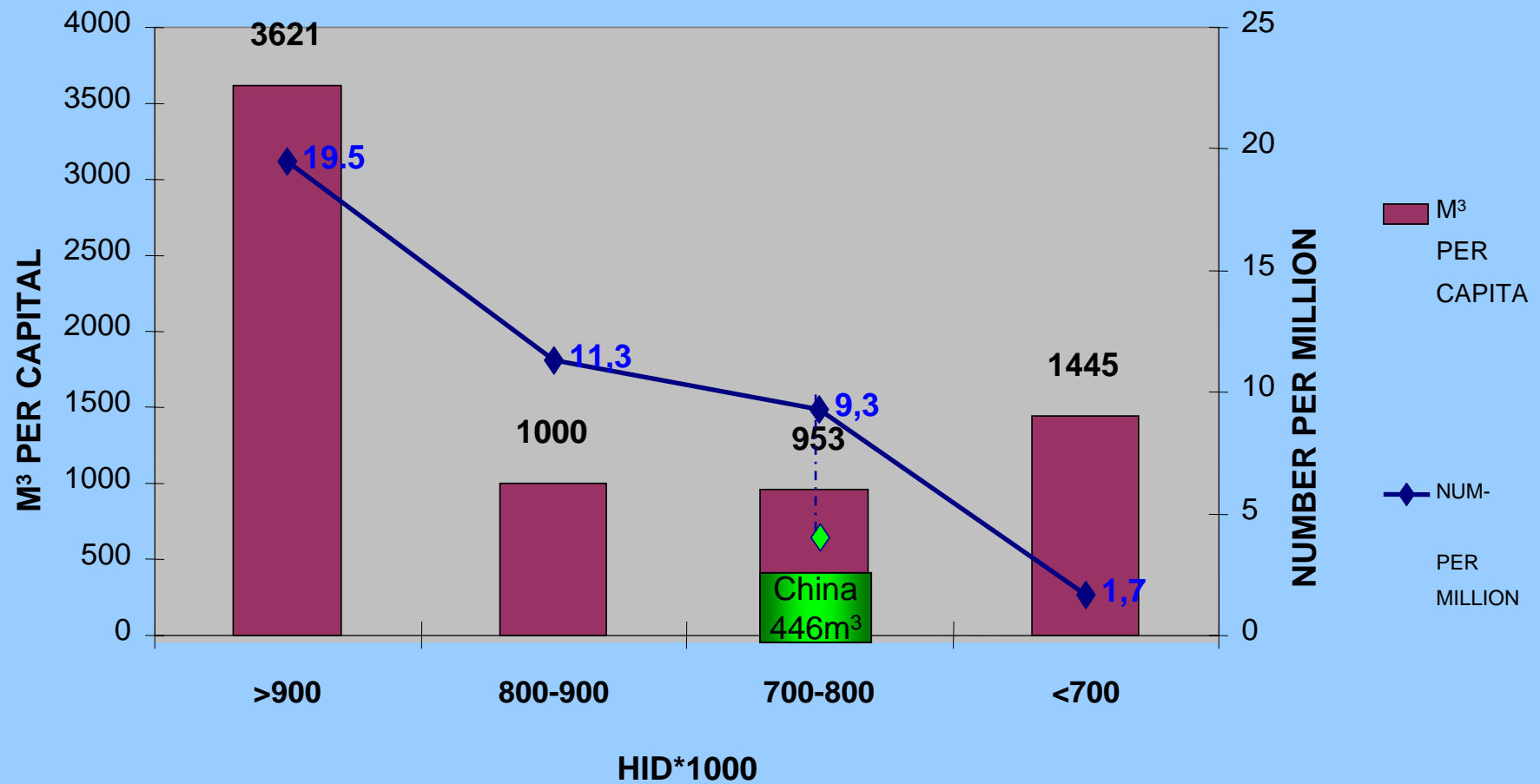
Storage per capita

AGUA ALMACENABLE EN EMBALSES PER CÁPITA





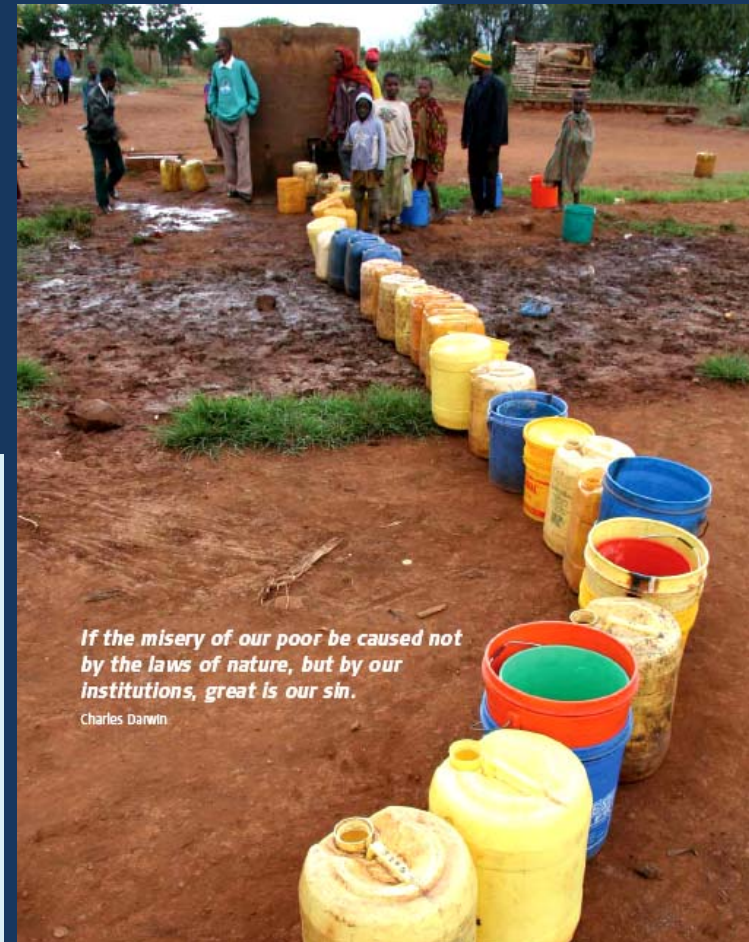
DAMS'S INDICATORS- HUMAN DEVELOPEMEN INDEX (HDI)



WATER AND ELECTRICITY POVERTY

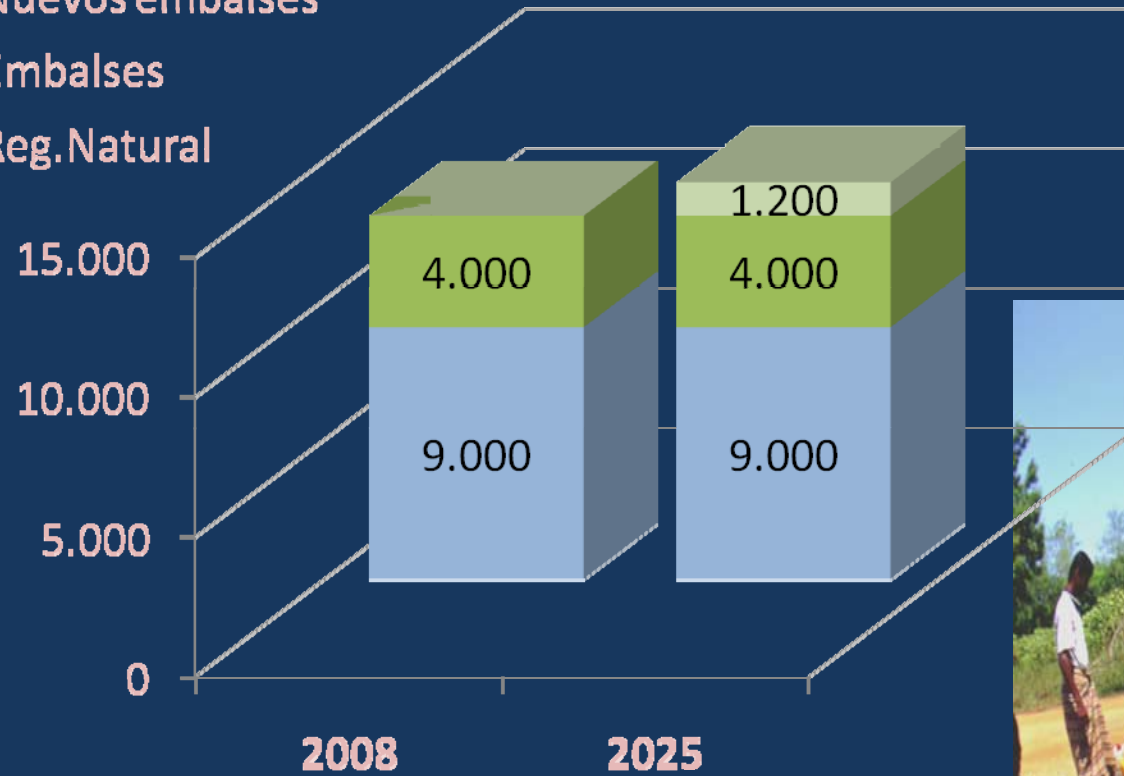
Lack of sufficient renewable water and hydropower resources is not the crucial factor in water and electricity accessibility

- In many cases, **storage is a viable option**, and given the current circumstances (a need for responsible development in the context of changing world, etc), increasing storage capacities is a major imperative.
- Storage should be utilized **as a tool to drive development**, taking into account the socio-economic and environmental impacts.



PAPEL DE LAS PRESAS EN LA REGULACIÓN DE LOS RECURSOS HIDRAÚLICOS: KM³ / AÑO

- Nuevos embalses
- Embalses
- Reg. Natural



ICOLD ENVIRONMENTAL POLICY

ICOLD recommends the management of the existing dams and the construction of new dams to remain within the context of **Integrated Water Resources Management**, taking into account their implementation within a framework of sustainable development, and adhering to the following basic criteria:

- Technical, Economic and Financial Feasibility
- Sustainable Development. Compatibility with the Environment
- Social and Political Acceptance

POSITION PAPER
ON DAMS
AND ENVIRONMENT

CHARTRE CIGB
SUR LES BARRAGES
ET
L'ENVIRONNEMENT

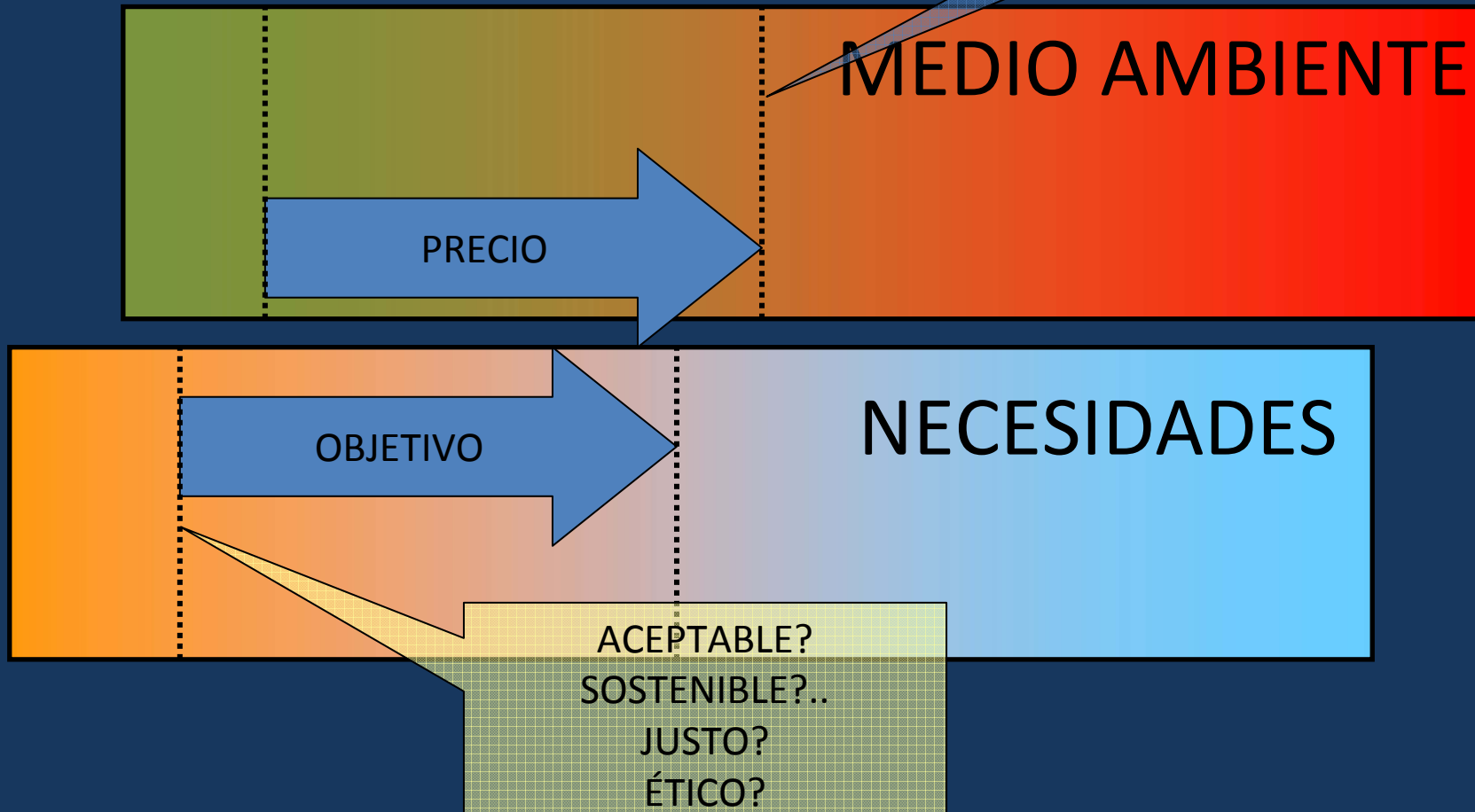


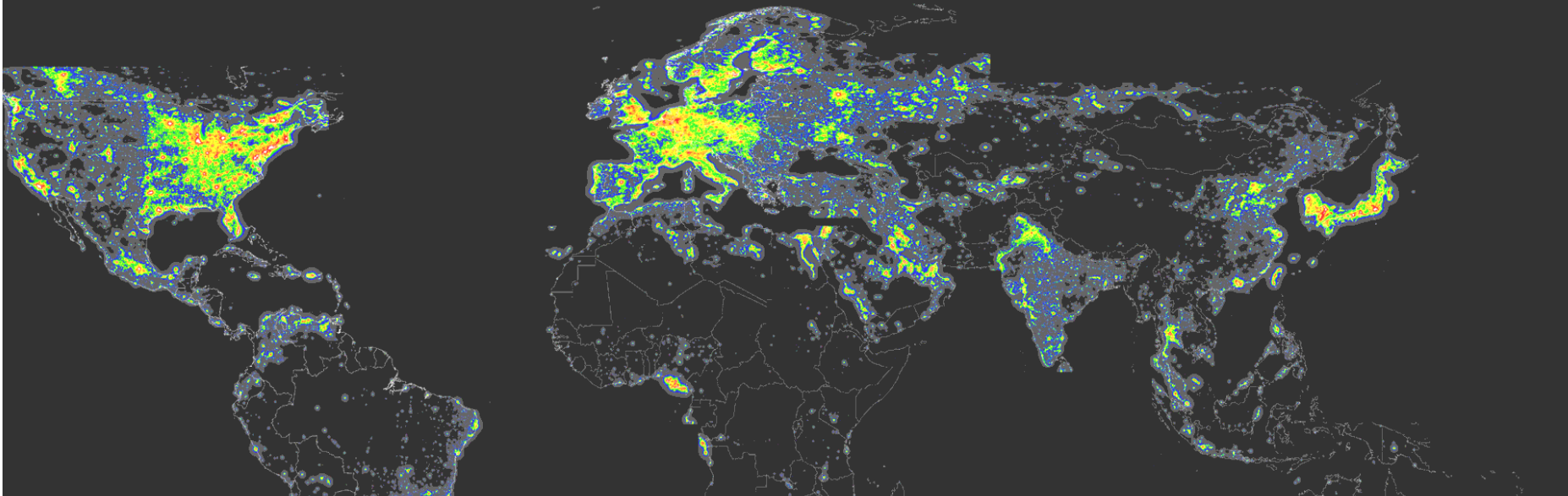
Mai 1997

EL RETO ÉTICO

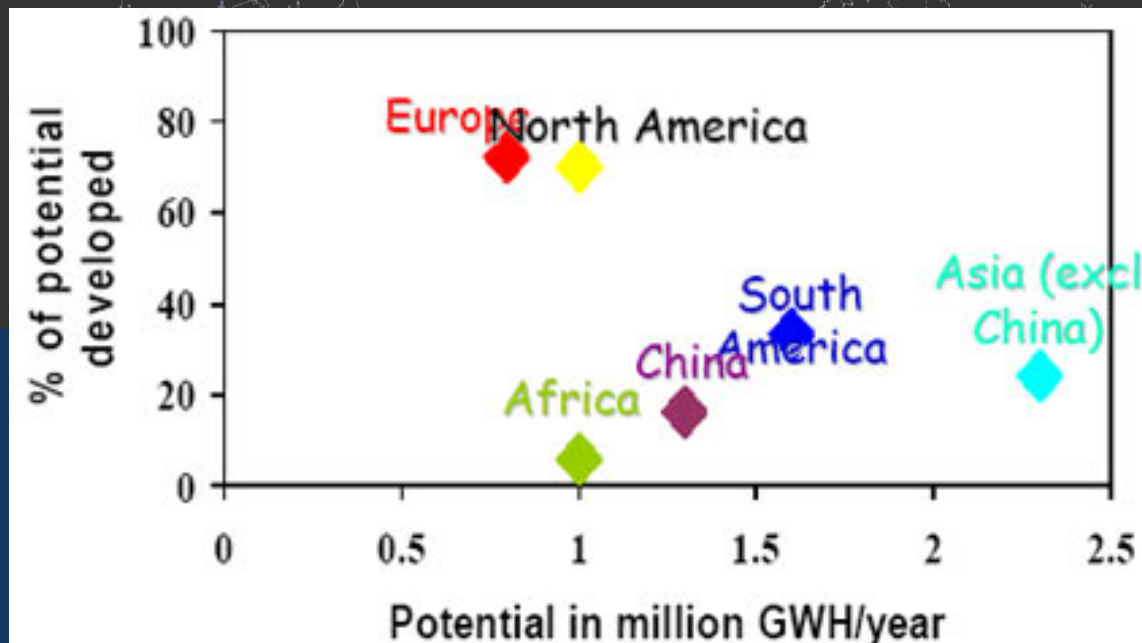
INTERNATIONAL TECHNICAL COMMITTEE ON THE RÔLE OF DAMS IN BASIN DEVELOPING AND MANAGEMENT

ACEPTABLE?
SOSTENIBLE?..



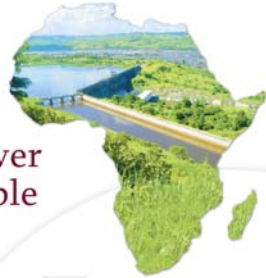


Potentiel hydro-
électrique
dans le monde



World declaration

Dams and Hydropower for African Sustainable Development



During the past century, hydropower has made an important contribution to development in almost all the regions of advanced countries, where most hydropower potential has been developed. In some developing countries, where most hydropower potential has been developed, it is essential to continue to develop hydropower, as well as to continue with measures to improve the efficiency and capacity of existing plants, to ensure that the world's hydropower potential is not lost and that the potential is well available in developing countries.

In Africa, too, the hydropower potential has been developed. It is essential to continue to develop hydropower, as well as to continue with measures to improve the efficiency and capacity of existing plants, to ensure that the world's hydropower potential is not lost and that the potential is well available in developing countries.

Huge needs

Amongst the developing states of the world, Africa is undoubtedly the continent where needs are the most urgent. In Africa, 65% of the population do not have access to electricity and consequently live with poor quality of services, in terms of lighting, clean water, health care and education. Electricity is an essential tool for achieving the objectives of the African Union, the Millennium Development Goals and Sustainable Development. The World Energy Council has estimated that the total electricity consumption in Africa is 147 TWh/year, whereas it is 14 000 TWh/year in North America. That means that Africa has a deficit of 13 853 TWh/year, which is a huge deficit in electricity, since it represents the energy consumption of 120 million people. Thus, Africa needs 140 TWh/year to reach the target of 14 000 TWh/year and 140 million people to reach the target of 14 000 TWh/year.

A reliable electricity supply, when it is provided in many parts of the world, can have a significant contribution to the life of the population in the less developed African states, in that it can provide opportunities for food and industrial supplies, and power supply for health care facilities. Particularly in rural communities, there are no alternative solutions. The potential of electricity will enable Africa to benefit from economic activities such as agriculture and industry.

Tremendous potential

Africa possesses the greatest untapped potential for producing electricity in Africa. There are projects for 100 000 MW of hydropower potential and generating more energy than 20 TW/year, which has the potential to deliver electricity cheaply (average cost of less than \$ 0.05/kWh), when the average cost for coal is \$ 0.10/kWh, and most of the world's hydropower potential is still untapped. The UN's report from 2007 states that Africa has a potential of 100 000 MW of hydropower potential, which is 10% of the world's hydropower potential. This potential can be developed through international cooperation with the necessary institutional structures to reach a good project.

The great development potential of this clean renewable resource is presently available in some of the countries with the greatest need for increased energy. It is essential to continue to develop hydropower, as well as to continue with measures to improve the efficiency and capacity of existing plants, to ensure that the world's hydropower potential is not lost and that the potential is well available in developing countries.

Hydropower has also two major environmental advantages: first it is a renewable energy and it is the most environmentally friendly energy produced with renewable energy sources from hydropower. Thus, it is a clean energy source that produces no greenhouse gases associated with any other low-carbon energy source. Second, it is a clean energy source that produces no greenhouse gases associated with any other low-carbon energy source. Second, it is a clean energy source that produces no greenhouse gases associated with any other low-carbon energy source.

Synergy between water and energy schemes

Africa has abundant fresh water potential of which only 4% is being exploited. However, it is to be noted that Africa lacks infrastructure to manage water efficiently. Thus, the average available per capita is very small. It calls for the African Union to take action to improve water supply and water management in Africa. The African Union is taking action to improve water supply and water management in Africa. The African Union is taking action to improve water supply and water management in Africa.

The African Union should consider large-scale fresh water management projects that will allow them to be fully integrated by development schemes. Secondly, the supply of clean drinking water and agriculture with sufficient food security are major additional benefits of hydropower.

Millennium Development Goals

There are African Union projects for hydropower that will allow them to be fully integrated by development schemes. Secondly, the supply of clean drinking water and agriculture with sufficient food security are major additional benefits of hydropower. The African Union should consider large-scale fresh water management projects that will allow them to be fully integrated by development schemes.

At the 9th African Union Summit in Addis Ababa, Ethiopia, March 2002, the African Union adopted the African Union Agenda for Africa 2025. The African Union is taking action to improve water supply and water management in Africa. The African Union is taking action to improve water supply and water management in Africa.

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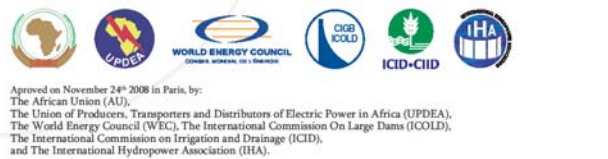
Promoting hydropower development that is environmentally friendly, socially responsible and economically viable

Regarding the environmental and social impact of hydropower, a number of countries have been successful in developing hydropower projects that are environmentally friendly, socially responsible and economically viable. These countries have developed policies, procedures and guidelines for evaluation and mitigation of environmental and social impacts, and for addressing the concerns of vulnerable communities affected by hydropower development. These guidelines have helped to address the concerns of vulnerable communities affected by hydropower development.

It is essential to continue to develop hydropower, as well as to continue with measures to improve the efficiency and capacity of existing plants, to ensure that the world's hydropower potential is not lost and that the potential is well available in developing countries.

Conclusion

It is essential to continue to develop hydropower, as well as to continue with measures to improve the efficiency and capacity of existing plants, to ensure that the world's hydropower potential is not lost and that the potential is well available in developing countries.



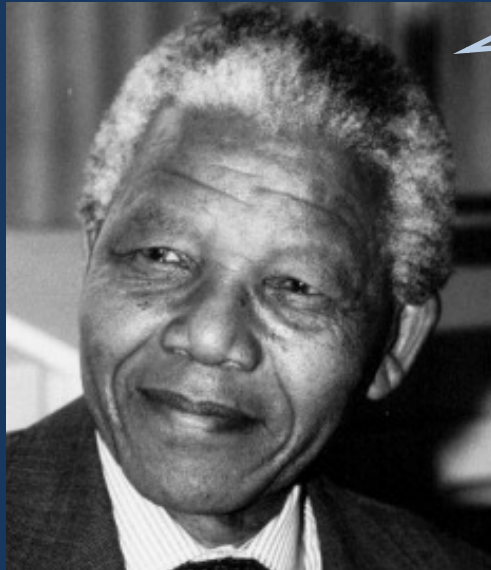
Approved on November 24th 2008 in Paris, by:
The African Union (AU),
The Union of Producers, Transporters and Distributors of Electric Power in Africa (UPDEA),
The World Energy Council (WEC), The International Commission On Large Dams (ICOLD),
The International Commission on Irrigation and Drainage (ICID),
and The International Hydropower Association (IHA).

Con el impulso de la CIGB se firmó en Paris en 2008 una Declaración Mundial Común para apoyar :

“Les Barrages et l’Hydro-électricité pour le Développement Durable de l’Afrique”

- UA
- CME
- ICID
- IHA
- UPDEA
- ICOLD
- Union Africaine
- Conseil Mondial de l’Énergie
- Commission Internationale pour l’Irrigation et le Drainage
- Association Internationale de l’Hydro-électricité
- Union des Producteurs et Distributeurs d’Électricité Africains
- Commission Internationale des Grands Barrages

« La liberté politique est insuffisante quand on manque d'eau.



La liberté politique est insuffisante quand on manque d'électricité pour lire la nuit, quand on n'a pas d'eau pour irriguer sa ferme, quand on ne peut pas attraper de poisson pour nourrir sa famille.

Pour ces raisons, le combat pour le développement durable est aussi important que le combat pour la liberté politique.

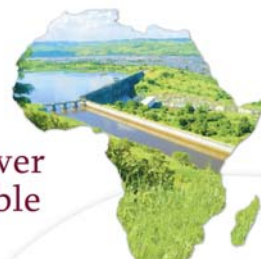
Ces combats peuvent se mener ensemble comme ils peuvent s'anéantir mutuellement »

Nelson Mandela



Thank you
Merci beaucoup
Muchas gracias

World declaration



Dams and Hydropower for African Sustainable Development

During the past century, it has been an important development, as dams in all developed countries, where the potential has been realized. In all countries, hydropower has contributed to economic growth and development and to the conservation of the environment. It has also been a major source of electricity and has a high potential in all developing countries.

In Africa, less than 7% of hydropower has been developed. The great potential in developing countries, combined with experience in large dams, is being brought to the world's attention, to meet the needs of the world's rich countries.

Huge needs

Among all developing areas of the world, Africa is the continent where the need is most urgent. In Africa, 85% of the population lives in rural areas with poor quality of services, in terms of clean water, health care and education. It is an essential need for the survival of the continent. The World Energy Council (WEC) estimates that Africa needs 100 GW of electricity by 2030. The continent has a potential of 100 GW of hydropower. The World Energy Council (WEC) estimates that Africa needs 100 GW of electricity by 2030. The continent has a potential of 100 GW of hydropower.

Tremendous potential

In the same time, there is a tremendous potential for electricity in Africa. The continent has a potential of 100 GW of hydropower. The World Energy Council (WEC) estimates that Africa needs 100 GW of electricity by 2030. The continent has a potential of 100 GW of hydropower.



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