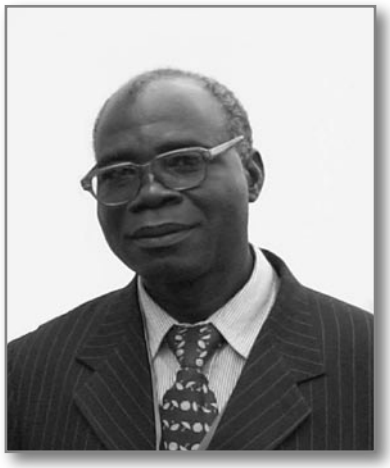
CIGB ICOLD

The Dams Newsletter

http://www.icold-cigb.org http://icold-cigb.net No. 7 - September 2008

ICOLD On the frontline for capacity building and training in Dam professions



Nombre Adama
Vice-president, ICOLD
(2005-2008)

ICOLD since it's creation on 1928 has contributed lot to the development of the dam and water resources professions worldwide for the benefit of humankind by creating the capabilities and developing human resources for harnessing water and energy resources. ICOLD bulletins, Guidelines, congress and symposia proceedings are rich materials available for the profession and specifically for young engineers and professionals. These last years with the increasing participation of member countries from less developed one and regarding the weak development of water resources, energy sector, food production in these countries and the lack of suitable capacities, ICOLD decides to implement a capacity building and training program for professionals these countries. The Program started on 2006 with the support of DSI of Turkey who supports a training program of three years for duration of one month in Turkey for young professionals in turkey. The first (2006) and second (2007) sessions were realised successfully with the attendance of 24 trainees coming from six countries (Nigeria, Mali, Morocco, South Africa, Burkina Faso, Zambia). The third session is schedule for May 2008 for 20 trainees. A second program supported by the State Secretariat for Hydraulics of the Kingdom of Morocco for training three young engineers per year for duration of three Months in the Kingdom of Morocco is on the way. The first session will be held soon this year. In the same framework ICOLD president, General Secretary participated at the Nigerian Committee on Large Dams first annual conference and the annual Conference of the Nigerian Society of Engineers held on December 2007. The NSE conference was devoted to human resources development in engineering field. During the Hydro 2007 conference held on October at Granada in Spain. Michel de Vivo and I chaired the closing plenary debate on capacity building which is emerging as a critical issue in less developed countries but also progressively in the developed one.

IN THIS ISSUE

Increased International Presence and Activities of ICOLD

Arthur Walz thinks back on the developments he has seen during his three-year tenure as Vice-President.

During the past three years, I have seen ICOLD make significant progress in several areas. Our technical committees continue to expand to meet new challenges while producing excellent reports and bulletins that are disseminated world-wide. In addition, the membership base of our National Committees continues to grow, which is a tribute to the international reputation of ICOLD and benefits of membership.

Of equal significance are ICOLD's increased international presence and activities. For example, ICOLD's presentations at the World Water Forum IV in Mexico City in 2006 were well received. I had the opportunity to make the ICOLD presentations. Representatives from several National Committees were also present. ICOLD participated in two sessions of the Theme "Water for Growth and Development". Our presentation in the first session, "Water Infrastructure for Sustainable and Equitable Development", addressed the key issues of meeting the UN Millennium Development Goals (MDG's) of fighting poverty, hunger, and assuring human health and safe environment by securing services for irrigation , drainage , access to clean drinking water and sanitation , clean and renewable hydro-electricity, protection from flood and draught and fostering efficient water transportation is clearly the role of water infrastructures in the sustainable and equitable development. Our presentation focused on dams as an essential and critical infrastructure for sustainable and equitable development in nation building in developing countries and regional development in developed countries. We also stated that comprehensive planning for water resources should be accomplished on a watershed basis.

The second session, "Ensuring Dams are a Platform for Growth and Sustainable Development" had the objective of clarifying the role of dams and their alternatives in water and energy resources development and management in he context of the MDGs while considering environmental, social and economic aspects in water and energy resources development and management. in the context of the MDGs. My ICOLD message was that multipurpose dams and

reservoirs have been successful in providing considerable benefits as nations pursued development and dam projects remained an integral part of our infrastructure to sustain life, reduce poverty and support economic development in all parts of the world. In the past, there have been costs (natural environment, inequitable distribution of benefits, resettlement, and inaccurate projections of demand) as a result of inadequate planning of many existing projects. We highlighted that progresses has been achieved in river basin monitoring and management and environmental mitigation and restoration and now better dam projects are now being built by ensuring a comprehensive planning and design process that includes not only «multi discipline technical input» but also «stakeholder involvement». While conservation, ground water and rainwater harvesting must be pursued, where significant quantities of water are needed for nation building or regional expansion, dams and reservoirs are the most realistic option.

Today, ICOLD is being asked to take the lead with other professional organizations in activities for The World Bank and the United Nations (UN). We continue as a Governor in the World Water Council and with the leadership of our President and Central Office, ICOLD will convene a Theme in World Water Forum V in Istanbul in 2009. We are participating in the expert group for storage for the World Water Assessment Project (WWAP) for UNESCO and in workshop for "Good Practice Communications Guidelines for Governance Reform and Sustainable Infrastructure Development – Opportunities in Dam Planning and Management" – for the World Bank

Today, ICOLD is not only the worlds leading professional organization but the world's most reliable source for accurate information on dams. We are also the leading advocate on the beneficial role of dams and reservoirs in developing and managing the world's water resources. ●

Arthur H. Walz, 67, is a Senior Water Resources Engineer. After 38 years of service in the US Army Corps of Engineers, where he headed the Geotechnical and Material Branch and the Dams Safety Division, he became a consultant for many dams' projects throughout the world. He was President of the US Society on Dams (1999-2001), Chairman of the ICOLD Committee on Public Awareness & Education and Vice-President of ICOLD (2005-2008).

A dam to save the "wonder of the West"

In 2008, the revered Mont Saint Michel, the "wonder of the West" will mark its Jubilee. For 800 years now, what is considered the essence of the Medieval Christianity is dominating the large bay at the point where Normandy and Britanny join. Surging from an infinite expanse of sand and waves, it appears as man's attempt to challenge the elements and time.

The «wonder of the West» is slowly loosing its maritime nature.

But today its very nature is threathened: Mont St Michel is gradually sinking into the sand and silt which accumulate for a century. If nothing is done, the Mont - and its abbey and the picturesque, tourist-thronged, winding streets of its medieval village - will cease to be an island within 40 years. Already some of the majesty has been sapped by the progress of the silt and salt marshes, and by the weed-like growth of car and coach parks over what was once the sea bed.

But something will be done! For nearly two years now, work has begun on a huge project whose goal is to restore the Mont in its original environment. Work has just begun

to restore, and enhance, the natural power of a man-tamed river - the Couesnon - which will flush the sand and silt banks out of the bay over the next 20 years. It sounds simple but nothing like it has been tried before. The project is immense, and at the same time gentle; unassuming; and not especially expensive at €164 millions.

An artiste view of the Mont with the new dam on the Couesnon river, which will act like a flush removing the accumulated sans and silt.

There are two keys to the project. The accumulation of silt has been encouraged by a mile-long embankment built in 1879 between the Mont and what the locals call "the continent". This will be bulldozed and replaced with a shorter embankment and a 700-metre low bridge by 2012. More importantly, a dam built 40 years ago at the mouth of the Couesnon, close to the Mont, will be replaced by a dam twice as large by 2008. Already half of the new dam has been built and the other half will be finished this year.

All sorts of other schemes to remove the sand and silt, including laborious dredging operations, have been considered over the past 90 years. The ingenious plan to use the natural power of a revitalised Couesnon was adopted after 10 years of scientific study. It was adopted only after eliminating all other possibilities.

A large-scale model of the bay was built by Sogreah, a consulting firm in Grenoble, in the French Alps. This model, at 1,000 sq metres or the size of four tennis courts, replicated the forces produced by tides, currents and river, recorded in the bay over four decades. Four months were

spent haggling over the correct consistency of the «model» silt and sand.

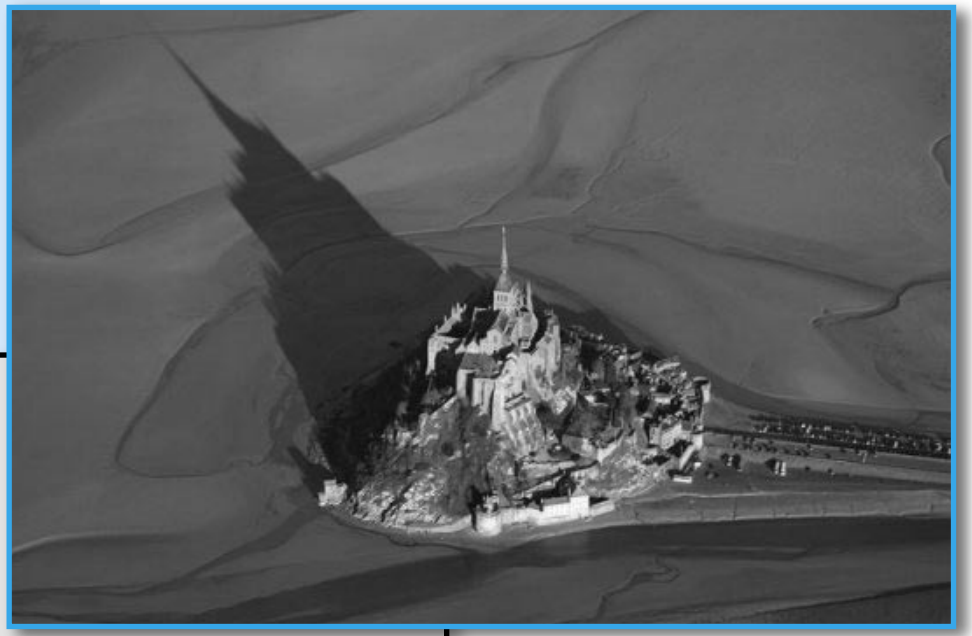
The first idea tested on the model was to remove the causeway and the existing dam. That helped to get the silt away but only very slowly. The second idea was to remove the embankment and convert the old dam to channel and strengthen the flow of the Couesnon. That also worked, but over decades rather than years. Finally, the scientists agreed that scrapping the causeway and doubling the size of the dam would do it. An international scientific commission has validated the complete project, which got the final go from the French government in 2006.

By reducing the natural strength of the Couesnon, the old dam, which was built to protect the polders, or reclaimed farmland, to the south from tidal floods, accelerated the build-up of silt between the river-mouth and the abbey-island. Before the construction of the dam in 1969, the river had a more efficient hydraulic power, which it has now nearly lost.

The new dam will allow seawater to pass up river at high tide, to be stocked in canals and a reservoir (which will provide a habitat for seabirds). The reservoir will contain up to 1 500 000 cubic meters. At low tide, the accumulated seawater and pent-up river-water will be released once or twice a day in a series of giant «flushing» actions. The force of the water, acting just like a toilet cistern on a large scale, will weaken and sweep away the grassed silt and sand banks over most of the mile between the Mont and the «continent». Half of the three millions cubic meters of accumulated silt will disappear within two years after the works are finished in 2012. Eighty per cent will go in eight years, by 2020.

110 meters long, the dam will include eight flow control gates, operated by 16 hydraulic jacks and commanded by electronic captors. Antoine Durand, the young engineer that is in charge of the dam, declared last year to the Independent that it "will be an elegant structure, in keeping with the beauty of the place. It will have a viewing platform and terrace and will be open to the public who will have a marvellous view of the Mont." Enthusiastic, he explained: "It is a very neat solution and will not spoil the beauty of the site with dredging machines. In any

case, it would have been inconceivable to shift so much silt mechanically."



Surrounded by the sea and the moving sands, the Mont-Saint-Michel is a rocky, cone-shaped, tidal isle in the north west of France, in the Gulf of Saint-Malo, which is connected by a causeway with the mainland.

The islet, renowned for its Benedictine abbey, has a picturesque view of small houses and shops on its lowest level. Above these stand the ascetic buildings, many of which date from the 13th century and are considered outstanding examples of Gothic architecture. The entire islet is crowned by the abbey church, about 73 m (about 240 ft) above sea level.

The Mount was connected to the mainland through a thin natural land bridge, which before modernization was covered at high tide and revealed at low tide. Thus, Mont Saint Michel gained a mystical quality, being an island half the time and being attached to land the other: a tidal island. The Mont has been one of the Seven Wonders of Europe since the early Middle Ages and one of the first places to be placed on the Unesco list of sites of world heritage. More than three millions people come from all over the world to visit it each year, making it the most visited monument in France, second only to the cathedral Notre Dame, in Paris.

The Mont today is a breathtaking collage of fortress, village and pinnacled abbey, built mostly from the 12th to the 16th centuries, all carved on, or into, a lump of rock 73 m high. It is 70 cm lower in the sand of the bay than it was in the 19th century. The water, which races dramatically across the sand at high tide, surrounds the island for only a couple of days a year. In truth, the embankment means the Mont is never cut off.

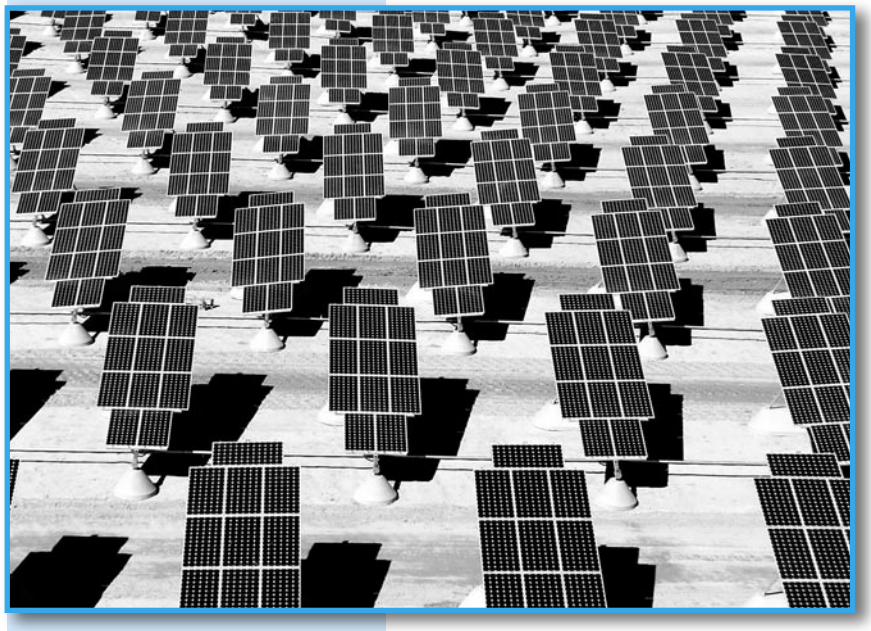
After the new dam is finished and the causeway removed, in 2012, the Couesnon will flow either side of the island. The demolition of parking places (today just under the Mount) will also add 15 hectares to the natural site. The bridge will end in a submergible jetty. By 2020, for the first time in 150 years, the Mont will become a genuine island again during the highest tides. Thus dams will have been both part of the problem and of the solution to save the maritime nature of the "marvel". ●

How alternatives to dams need dams?

Solar cells and wind mills are among the most often quoted "alternatives" to hydroelectricity promoted by anti-dams movements. Two recent developments in those areas show that those alternatives are not reliable without the synergy with hydro power.

In Germany, the subsidies for the solar industry are down

Those large subsidies given to the solar cells produced electricity have been installed by the German law on renewable energies (EEG). They were crucial for giving an impetus to that sector but were harshly criticized. German Environment minister Sigmar Gabriel is now working on an amendment to EEG, which should lead to diminish the subsidies. The solar industry should nevertheless remain profitable. In 2006 solar energy producers were receiving €ct 58.1 per KWh, ten times the production price of conventional electricity and five times the subsides given to the wind power industry (€ct 8.7 per KWh in 2006).



An array of solar cells in California

The Economic Research Institute RWI is criticizing the costs of the solar subsidies, which are deemed disproportionate compared to their effects on climate or on employment : the support given to the solar lobby would be equivalent to subsidy each employment with 128.900 euros and the cost of a ton of CO2 spared thanks to the solar electricity would cost 900 euros, while the price on the European market is between 5 and 20 euros.

A single windmill in Northen France

According to Sigmar Gabriel's plans, the subsidies given to the solar industry should diminish by 7 to 8.5% each year, beginning 2009.

The end of wind glory in Denmark ?

Denmark is often presented as the ideal country by the antidam movement, as the example to follow. The country is "what a global warming solution looks like," wrote Frances Beinecke, the president of the Natural Resources Defense Council. The WWF climate campaigners are always giving Denmark as an example.

Denmark is indeed the world champion of both wind energy and energy efficiency. 15% to 20% of its electricity is produced by its 5 400 wind mills (one every 8 squared km of the country). But despite that, the greenhouses gases emissions have grown by 11 % between 1990 and today, whereas the country had committed itself to reduce them by 21%. The per capita emission of Denmark is the highest in Western Europe. For all its wind turbines, a large proportion of the rest of Denmark's power is generated by plants that burn imported coal. With only 10 millions inhabitants, Denmark is the seventh biggest coal importer in the world. Moreover, the wind success is highly dependant on governmental subsidies : when a new government strongly reduced them, the wind mills construction stopped instantly: only 6 mills were built in 2006. The building of wind turbines has virtually ground to a halt since subsidies were cut back.

Electricity from the wind is clean and costless, once the mill has been built. But it has a major defect that is called volatility. Just one example: in summer 2007, during one night, as steady winds swept in from the North Sea, the wind farms produced 70% of the electricity being consumed across the country. Less than 48 hours later, that proportion felled to 2%. Expressed in electricity produced, that's 2500 MWh/h one minute, less than 100 MWh/h two days later. Wind farms are not reliable: less than 10 MWh/h was produced across all of Denmark for four hours straight. Back in February 2007, less than 100 MWh/h for 36 hours straight. In other words, if Denmark was to rely on wind, a day and a half with no power.

Of course, it's not the case. But due to that uncertainty of whether the wind will blow, Energinet.dk, the organisation responsible for ensuring that the country can meet its electricity demand, has to keep a reserve of conventionally produced electricity in case the wind dies down. The extra

cost is typically passed on to consumers in the form of higher electric bills.

Maintaining that safety net results in a near constant overproduction of energy, reducing wind power's share of the total amount actually used to power Danish homes and factories to 8.3 percent. The unneeded electricity is exported, normally at a lower price than that paid to windmill owners.

Denmark has the biggest wind component in its power generation in the world. The reason it sort of works in Denmark, putting aside the question of price, but can work only in Denmark, is that the country is relatively small and connected to Norway, Sweden and Germany.

In a funny paradox, Denmark's wind works rather well because it is joined to Norway's hydro : the hydro can be turned on and off. But if the wind don't blow, it's still drawing power from Sweden's hydro and nuclear and Germany's coal and nuclear.

Denmark is an example touted by the anti-dam movement, but it cannot operate without the dams of their neighbours: at some times, it needs an extra power from outside that reaches 40 or even 50 % of its total consumption.

Offshore windmills are not the hoped for solution

Wind industry has had technical setbacks, as Danish wind operators, hoping to bypass local objections and take advantage of stronger, steadier air currents, have tried to build giant turbines at sea (some are now more than 100 meters high and have blade assemblies nearly that wide). In one case, in 2004, turbines at Horns Reef, some 10 miles off the Danish coast, broke down, their critical equipment damaged by storms and salt water.

Vestas, a Danish manufacturer and the world leader in wind turbines, fixed the problem by replacing the equipment at a cost of 38 million euros. But Peter Kruse, the head of investor relations for Vestas, warned that the lesson from Horns Reef was that wind farms at sea would remain far more expensive than those on land.

"Offshore wind farms don't destroy your landscape," Mr. Kruse said, but the added installation and maintenance costs are "going to be very disappointing for many politicians across the world."

Strangely enough, the best friend of the wind turbines promoted by antidams are.... Dams ! The reservoirs associated with hydroelectric plants are the best way to store the energy produced by the wind. Wind turbines situated near the dams can pump water whenever there is wind. But the energy thus stored can be kept for peak time. In Quebec, for example, some people have proposed to add windmills on dam site and argue that all the infrastructures needed to exploit windmills are already there, including roads and electricity transmission lines. The other point which explains why the Denmark example is not viable elsewhere and cannot be duplicated in large countries : the cost.

In order to promote construction of wind turbines, the government has agreed to purchase the electricity they generate at a minimum price. The guaranteed prices have had the desired effect: some 5300 wind turbines dot the Danish countryside, producing 18.5 percent of all electricity generated.

The practice has its downside, however. The guaranteed prices for wind power results in an overproduction that cost the state an excess DKK 21.6 billion between 2001 and 2005, according to figures from the National Audit Agency. This huge cost explains why the government decided to reduce the subsidies. But recently, the wind industry lobby won and the subsidies are up again.

Under the plan adopted this year by the government (and prepared by the Danish Wind Energy Association), subsidies for a kilowatt hour produced by a new wind turbine would be increased to DKK 0.20 (EUR 0.02) from the current DKK 0.123 (EUR 0.01) in the first five years and be gradually decreased afterward. This ambitious plan could prove costly, with some calculations putting the economic costs of the package at DKK 5.2 billion annually. Energinet.dk expects to invest DKK 3.4 billion to connect new wind turbines to the power grid, with consumers again likely to foot the bill.

During the presentation of the plan, the energy minister Flemming Hansen said the price was one the government was willing to pay: 'We don't know how much this is going to add up to, but we are willing to pay it, no matter how much it costs.' Very few countries in the world could afford such positions. ●

Nigerian Committee On Large Dams (NICOLD) host first Annual Conference In Abuja, Nigeria

The Nigerian Committee on Large Dams hosted its first Annual Conference. The theme of the conference was: Dams and Reservoirs as Assets in National Development. The conference took place at the International Conference Centre and Chelsea Hotel in Abuja between December 1st – 5th, 2007. The sub themes included the following:

New Perspective in Hydroelectric Power Development in Nigeria / Dams Safety and Instrumentation / Reservoir Operations / Environmental Issues / Small Dams.

Participants at the Abuja conference included Secretary General M. De Vivo (2nd from left) and President L. Berga (3rd from left)

Over 140 delegates cutting across all stakeholders from the Universities, the contracting/consulting firms, the Water Boards, the River Basin etc. attended the Conference. The participation of the Nigerian Society of Engineers with NICOLD in hosting the conference should be emphasized. The annual meeting of that Society was taking place in the same location. Vice-President Adama Nombre and Secretary General Michel de Vivo have presided the most important session of that conference, devoted to capacity building

International Commission on Large Dams (ICOLD) President and Secretary General, Vice President of ICOLD and delegates from West African sub region of Burkina Faso and Mali, members of Nigeria's National Assembly, representatives of other interest groups attended.

The Honourable Minister of Agriculture and Water Resources, Dr Abba Sayyadi Ruma was represented by Honourable Minister of State, Ademola Seriki who informed delegates that the construction and maintenance of dams is central to the Seven Point Agenda of the administration especially in the area of generation of energy and food security. Government is also encouraging private sector to invest in the construction of dam infrastructure. A proper legislative framework to support this partnership is now in place.

ICOLD President emphasized on the need for the construction of dams and reservoirs in order to mobilize the world's available water resources to enhance water supply services, irrigation practices, hydropower generation, tourism and environment. To control social and environmental impacts in dam construction, he advocated for integrated water resources management and sustainable development. He informed delegates that Nigeria has benefited from human capacity training program of ICOLD. The presentation by ICOLD Secretary General revealed the enormous hydropower potential of the African continent and the desirability to turn things around to enhance socio-political development. Vice President of ICOLD spoke on Capacity Building. After the conference, President Berga and Secretary General were received by the Vice-President of the Nigerian Republic.

The conference identified a number of problems affecting sustainable development of dams and its associated uses in Nigeria. These include inappropriate legal and regulatory framework, lack of capacity building issues in water resources program, lack of data on dam issues, poor planning and execution of projects as well as limited funding.

At its closing session, the Conference delegates adopted some recommendations as practical steps to national dam development.

- The need for Government to establish appropriate legal, institutional and regulatory framework in the planning, construction, operation and maintenance of dams.
- Encouragement of public-private partnership in the construction and management of dam infrastructure.
- Urgent need for Government to adopt the practice of integrated water resources management as a matter of deliberate policy.

Collaboration of ICOLD member countries in the Africa sub region in dam development was highlighted.

There was a technical exhibition which brought together a number of contractors, consultants and suppliers in the dam and water resources sector. The post conference technical tour took delegates to the Gurara water Transfer Scheme. The Scheme consists of a dam and transfer of water through a 3meter diameter steel pipe, 75km long. The project is to supply water to the Federal Capital Territory for the next 50 years. ●

Ethiopia, a future major African player in power production.

Item	
Country population	79 Million
Electrical Energy production	2900 (GWh)
« « consumed	2500 (GWh)
Rate of Energy independency	116%
Hydropower	
Installed capacity	670 MW
Annual mean production	2700 GWh
Number of dams	
Number of dams (15m <H < 60 m) Number of dams > 60 m	11 -
Storage capacity Irrigated land	12 km^3 2700 km^2

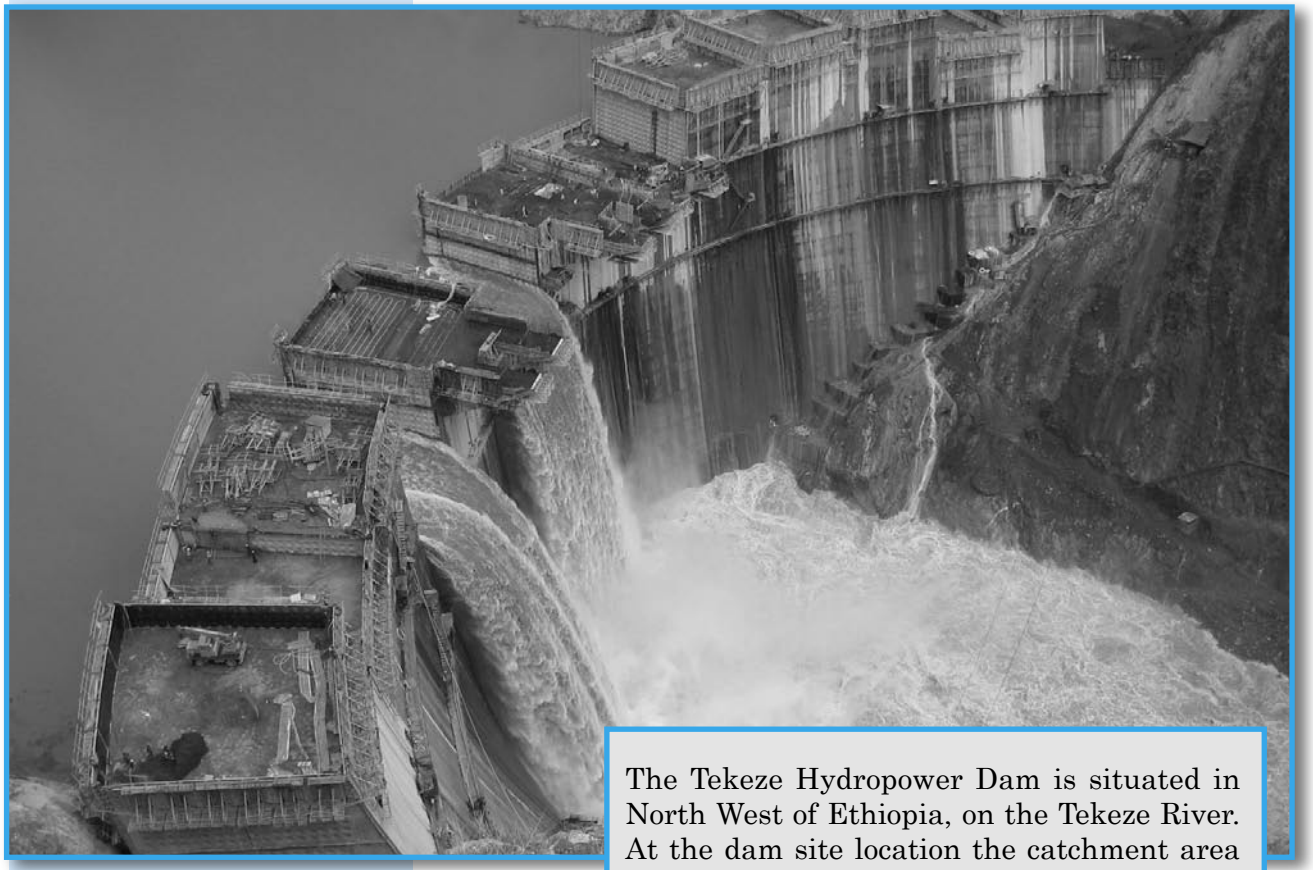
Ethiopia became in 2006 the 88th member of the International Commission on Large Dams. This mountainous state from African Horn is strongly connected to hydroelectricity since most of its power production is based on it: some 700 MW out of 800 MW. The remainder comes from fuel generators.

But the huge potential for hydroelectricity dwarfs those 700 MW actually operating. The rivers which are racing down from the high plateaus (85% of the Nile water content) represent a real treasure yet to be exploited. The Ethiopian Ministry for Hydraulic Resources evaluates the hydroelectric potential of the country at more than 38 000 MW of installed capacity. This is equivalent to 23 last generation nuclear reactors This would translate into 160 000 GWh of power per year.

This potential is now being turned into actual capacity, thanks to three major projects which are nearing their completion. The 185 meters high Tekeze dam alone, will generate 225 MW and will enable to develop the dry lands in the North of the country, where more coffee, the main

Ethiopian export good, will be grown. It is being developed by China National Water Resources and Hydropower Engineering Corporation (CWHEC) and should begin its operation in 2009.

The Geligele Gibe dam, major extension of an existing small dam, should add another 420 MW. Finally the Beles project (235 MW) will open 7000 new hectares of land for development, thanks to irrigation. Both dams are developed by the Italian company, Salini Costruttori S.P.A., which is very active in the country.



The Tekeze Hydropower Dam is situated in North West of Ethiopia, on the Tekeze River. At the dam site location the catchment area is estimated to be about 30,390 km^2. The climate of the basin is dry, with an annual rainfall varies from 700 to 1200 mm, and more than 75% of the river flow concentrated in the months June-September.

The topography and geology make Arch dam the more attractive among the various possible options. The dam is a double curvature Arch dam with a height of 175 m and a storage capacity of about 9Bm^3. The firm power generation capacity of the dam is 981 Gwh and the installed capacity is 300 MW.

The dam is currently under construction and energy generation is expected to commence at the end of 2008.

Recognizing the fact that water infrastructure investment is a key to development, the government of Ethiopia has developed a 5 year strategic plan which gives due consideration for water supply, hydropower generation and irrigation development.

Thus to gain international experience and lessons on the state of the art in large dams design, construction and operations, the Ethiopia National committee on large dams (ETNCOLD) was established in 2006 and joined the International Commission on Large Dams (ICOLD) in 2007. The executive committee is comprised of managers and experts from Ministry of Water Resources, Power-utilities, Construction Companies and Consulting firms.

The Ethiopian production capacity will thus increase, cumulated, by 1155 MW, a 240% jump! Right now, only 15% of he population has access to electricity, but this should reach 20% in 2012, partly thanks to those ongoing projects. Ethiopia also hopes using those projects to sell power to its neighbours : Sudan, Kenya and Djibouti. Sudan made a commitment to buy 200 MW in order to replace its polluting and costly thermal plants, burning fuel.

That operation would create a double benefit : diminishing Sudanese greenhouse emissions and increasing the income available for the development projects in Ethiopia, by tens of millions of dollar a year.

On a longer term, the gigantic Kara Dobe dam, a joint Sudan-Egypt-Ethiopia project would represent 1000 supplementary megawatts. An agreement signed by the three countries plan to build a series of dams in the Oromo Province, Kara Dobe being the first of them. That would be the biggest Ethiopian hydroelectric complex, but the funding is still problematic.

Thanks to its ICOLD membership, Ethiopia is acceding to capacity building and is in contact with dam engineers from all over the world.

It is hoped that this will help to improve the maintenance of existing dams and to fight against silting which has reduced their capacity.

It is also hoped that Ethiopian engineers will contribute to the improvement of knowledge in the field of dams situated in arid zones. ●

India : When dams contribute water, they also help to better girls' education

This is an often forgotten side-effect of the water storage function of dams. When water is available, girls are freed from the exhausting and time-consuming task of insuring water transport.

A Northern India girl working her lessons.

In an article titled "Water supply assured, village folk send their girls to school" published in Times of India, the journalist reports the story of Sharda, 12, who is going to school for the first time. What's more, she is one of the girls who is part of the sudden jump in the number of students going to primary school in the drought-prone Surendranagar district.

In fact, after many years, the primary school in Moti Morsal in Salya taluka of Surendranagar has shown an attendance jump from a dismal 30-40 students to a 100 students – 50% of whom are girls.

The turning point for the students and school is not an aggressive education drive, but the fact that there is drinking water in the homes of almost each of the 130-odd families residing in Moti Morsal. This is a luxury, considering that acute water scarcity stares in the face of around 300 villages in Surendranagar currently.Villagers say earlier girls were forced to stay home to either help collect water from distant sources.

The water availability has decided parents to pack schoolbags and send their girls back to classrooms. "I and my daughter used to trek 2-3 km everyday to fetch water to drink and cook. Water is the most pressing problem in our district and almost all parents would'nt send girls to schools and take their help in stocking water instead. Now, my heart swells with pride when Sharda goes to school," said the 12-year-old's mother Lakhuben Vasrambhal. ●

Mozambique takes control of biggest dam in sub-Saharan Africa

One more example of how important dams are to national sovereignty. Mozambique has finally taken control of the biggest dam in sub-Saharan Africa which had remained in Portuguese hands for more than three decades after the former colonial power's departure.

President Armando Guebuza was joined by Portuguese Prime Minister Jose Socrates and seven other African heads of state at the Cahora Bassa dam Tuesday for a handover ceremony seen as marking a final break with the colonial era.

«We are finally going to be able to use the dam to satisfy the energy needs of our country», declared Guebuza to AFP, ahead of the handover which was made possible after Mozambique was able to buy out Portugal's controlling stake.

The artificial lake created by Cahora Bassa, situated in Tete province, covers an area of 2,000 square kilometers (800 square miles) which stretches to the point where the borders of Mozambique, Zambia and Zimbabwe converge.

After a troubled history it is now seen as a key to providing clean energy not only for one of Africa's poorest country but several others in the region. «Given its production capacity of more than 2,000 megawatts, Cahora Bassa is important for the development of clean and ecologically-sound energy not only in Mozambique but for a big part of southern Africa as well» said government spokesman Luis Covane. Moreover, the theoretical production capacity of Cahora Bassa is 14,000 MW.

Guebuza has expressed hope that as well as continuing to supply long-time customers South Africa and Zimbabwe, it can also provide electricity in the future to other neighboring countries such as Zambia and Malawi in a region which is facing an increasing power deficit. Until now, 60 % of the electricity produced was sold to South Africa, 40% to

Zimbabwe and Mozambique consumed only 5%, bought back to South Africa at market's prices.

Since Mozambique's independence in 1975, the former colonial power continued to control the dam by retaining an 82 percent stake while the government in Maputo owned a mere 18 percent.

The giant Cahora Bassa dam is the biggest dam in Sub-Saharan Africa, 2nd only to Aswan dam in the continent.

Situated on the banks of the Zambezi river, the dam took six years to build and was only completed in 1975 as Portuguese rule drew to a close. Paralyzed during the 1976-92 civil war as a result of sabotage attacks by Renamo rebels before being extensively repaired, it is the biggest hydroelectric dam in terms of concrete volume in the whole of Africa.

Only Egypt's Aswan dam, which has created a lake covering some 2,700 square kilometers, is bigger in terms of surface water.

Thirty years of on-off negotiations over its ownership were finally brought to a close on October 30 last year with the signing of a purchase agreement between Portugal and Mozambique which Guebuza described as marking «the final chapter of the history of foreign domination» in Mozambique.

Under the terms of the agreement, the Mozambican government had to pay Portugal a total of 950 million dollars to buy the 82 percent controlling stake still held by Lisbon.While Maputo handed over an initial 250 million dollars when the agreement was signed, it was given a 14-month grace period to come up with the balance.

On October 30, two months ahead of schedule, the government informed Portugal that it had already come up with the money necessary to buy all but 15 percent of the stake from Lisbon. In order to finance the purchase, Mozambique launched an international appeal for funds in coordination with the World Bank and some of HCB's clients, including South Africa's state energy supplier Eskom and Zimbabwe.

The appeal was taken up by a Franco-Portuguese consortium, made up of the investment banks Calyon and BPI, which is underwriting the purchase agreement. ●

Dams after Japanese Earthquake

An eyewitness report from Japan on the effects the recent Earthquake had on the dams

N. Matsumoto, Vice-President, ICOLD

1. The Earthquake

The earthquake occurred at 8:43, on June 14, 2008 in the Northern Japan. It was just one day after I returned home from ICOLD annual meeting in Sofia. The Japan Meteorological Agency (JMA) named the event as the Iwate-Miyagi Nairiku Earthquake in 2008. Here, "Nairiku" means Inland. The magnitude of the event was 7.2 in JMA Scale and the hypocenter of the earthquake indicates the shallow thrusting fault with the length of 27km and the width of 11km.

2. Instrumentations

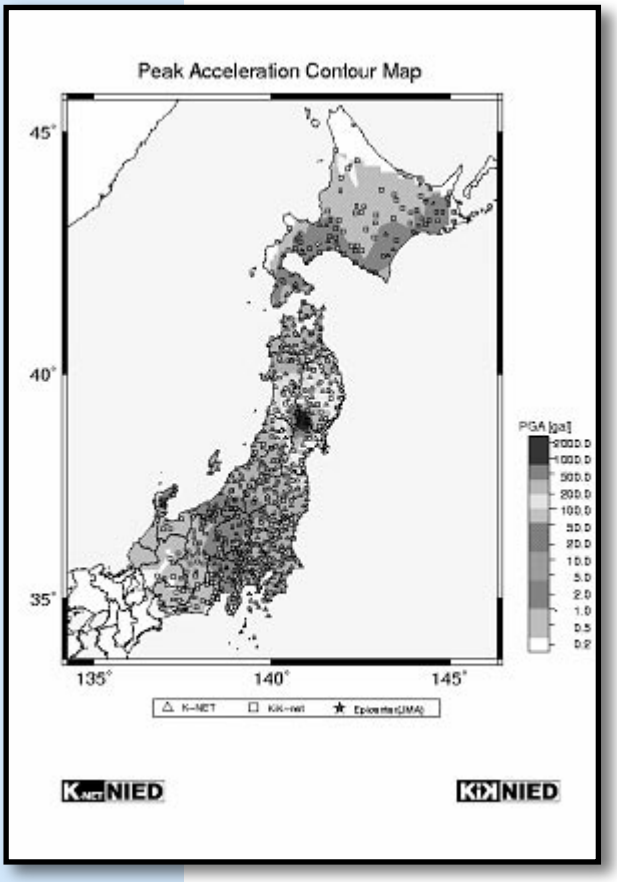


Fig. 1 Distribution of PGA by NIED

National Research Institute for Earth Science and Disaster Prevention (NIED) has strong motion instrumentation networks such as K-NET and KiK-net. At 325 stations strong motions were recorded. According to their data, the distribution of PGA (=Peak Ground Acceleration in cm/s^2) is given in Figure-1. All data are open to the public and you can see more details at http://www.bosai.go.jp/e/index.html.

At the station of IWTH25, large PGA was recorded as shown in Table-1. They have two instruments at the ground surface and at the depth of 260 meter below the ground surface.

Table -1 PGA at Station IWTH25

	PGA cm/s^2			PGV cm/s		
	NS	EW	V	NS	EW	V
depth at – 260m	1,036	748	640	42	37	68
surface	1,143	1,433	3,866	71	62	85

NIED switched instruments from 2g capacity to 4g capacity by the year 2007 and this time they recorded maximum motions. One characteristic of the recorded motions at this event is in very large vertical motions. The location WITH25 is at the hanging wall side of the thrust fault. NIED will study the effects of surface structure of the ground on the accelerograms and how the instrument is fixed to the base. At other locations close to the fault, also large PGA's were recorded as indicated in the PGA contour map. At three locations PGA exceeding 1g was recorded.

3. Damages

I visited the Iwate and Miyagi Prefecture three days after the event. The epicentral region or the hanging wall side of the thrust fault is mountainous area and there are few houses in the area. Therefore I seldom saw the collapsed houses. Only ten houses were broken reported. In this area, most houses have light roof instead of heavy ceramic tile which is very common in Southern Japan. I guess the light roof and predominance of high frequency component of the motion reduced the damage of houses in spite of large PGA.

Land slides occurred at 15 locations. They are really disaster. One land side occurred close to the Aratozawa Dam. Part of the slide mass fell into the reservoir and caused 2.4 meter rise of the water level. See the Photo -1 and 2. 12 people were killed and 10 people are missing still now as of July 7, 2008. Most of them were victimized by the land slides and debris flows.

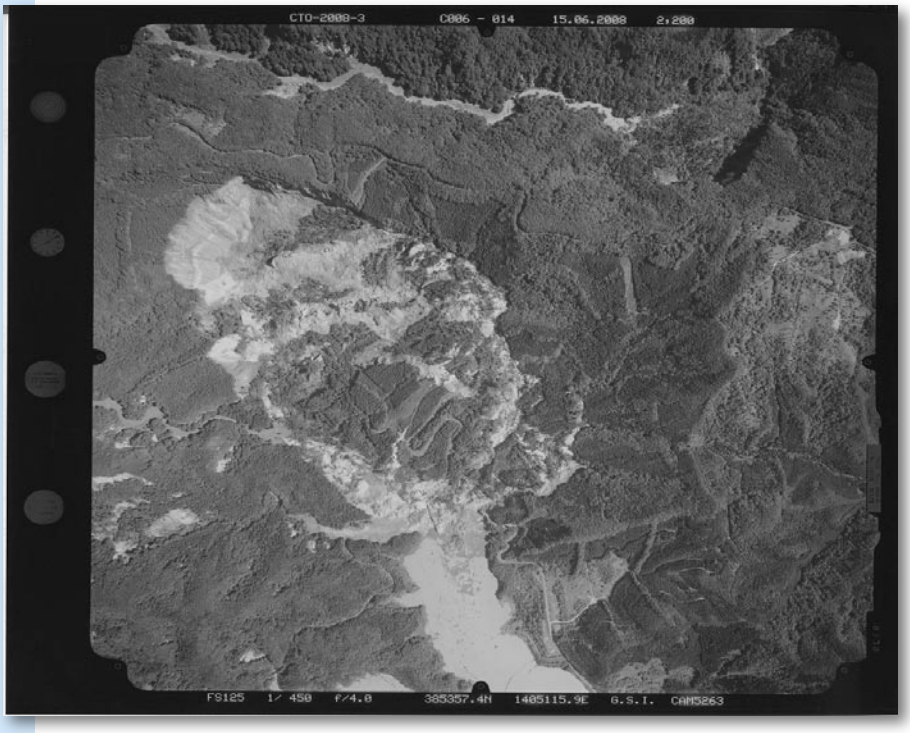


Photo-1
Aerial Photo by Geographical Survey Institute
The Bottom is the upper reach of the reservoir.

Photo-2
The slide mass at Aratozawa Dam

The Aratozawa Dam is quite OK. It settled about 20cm and found no cracking or other harmful features. PGA at the foundation was about 1g with high frequency component.

As of June 15, 134 dams were inspected, of which 134 dams were made for immediately after inspection within three hours and 72 dams for secondary inspection within 24 hours. No serious damage was recognized for dams.

Ishibuchi Dam was completed in 1953 by dumped rock CFRD and experienced large PGA around 2.0g. We had surface cracking on the crest which is very common for fill dams in case subjected to strong shaking. See the Photo-3. The settlement was 30cm. Handrail is tilted and at some portions we found more distortions.

Photo-3
The crest road of Ishibuchi Dam after the Earthquake

Most important aspect is no damage for the concrete face. See the Photo-4.

Photo-4
Concrete Face after the Earthquake

Also the spillway is perfect. Gates function as normal as illustrated in the Photo-5. Power house is now under shut down and water is releasing from the spillway.

The strong motion instruments are placed at the crest and right abutment. PGA is about 2g.

Photo-5
Spillway after the Earthquake

Just downstream of Ishibuchi Dam, a 132 meter high new rockfill dam with central clay core is being built. The dam is now about 80 meter above the river bed. The part of haul road wad damaged. There was also rockfall.

This author will show you more details at 23rd ICOLD Congress in Brasilia. Note the above descriptions may be corrected later because this is a very quick report. ●

DIARY

◆ October 13-18, 2008 ◆
Lahore, Pakistan

20th International Congress on Irrigation and Drainage.

Participatory Integrated Water Resources Management - From Concepts to Actions

◆ October 7, 2008 ◆
Montreal, Québec

Electricity and Climate Change: Carbon Markets and Adaptation Measures
www.qvc.qc.ca

◆ October 16-18, 2008 ◆
Beijing, China

High-level International Forum on Water Resources and Hydropower
http://www.iwhr.com/special/iwrhf/index-e.asp

◆ November 24 2008 ◆
Paris, France

ICOLD 80th Anniversary Ceremony
http://www.icold-cigb.net/

◆ 26-27-28 November 2008 ◆
Paris, France

Solving the Water and Energy Nexus
UNESCO Workshop

◆ March 10-12, 2009 ◆
Las Vegas, Nevada

Renewable Energy World Conference
http://rewna09.events.pennnet.com

◆ 26-28 November 2008 ◆
Vienna, Austria

15th International Seminar on Hydropower plants
contact e-mail:
eduard.doujak@tuwien.ac.at
www.viennahydro.com

◆ March 16-22, 2009 ◆
Istanbul, Turkey

5th World Water Forum:
Istanbul 2009
«Bridging Divides for Water»

◆ May 21-29 2009 ◆
Brasilia, Brazil

77th Annual Meeting of ICOLD
23rd ICOLD Congress
http://icoldbrasilia2009.org

I am sure the Brazilian Committee on Dams will operate with great technical brilliance and excellent organization, to show us all Brazil's great natural beauty. Furthermore, the country's excellent dam experts will be showing us their achievements, as well as the role that dams have played in developing the nation and generating hydropower.

Brazil is one of the largest states in the world, and has major rivers with abundant water resources. Brazil is also a nation that plays a very important role in the field of large and very large dams. The country has some of the largest dams in the world, and I think dam experts would find it extremely interesting to see with their own eyes, the Brazilian experience in planning, constructing and operating large dams in harmony with the environment. Brazil has enormous hydropower potential, and therefore it also has great possibilities for developing this type of clean and renewable energy.

As you know, ICOLD is now focused on the dissemination of dam technology in favor of the developing countries.

Therefore, the subjects that are going to be discussed at this Conference are all issues that are essential to dam engineering and the role played by dams in achieving sustainable development:

- Dams and hydropower
- Management of siltation in existing and new reservoirs
- Upgrading of existing dams
- Dam safety management

The ICOLD Technical Committees are also going to meet during the Annual Meeting. All these interesting activities are going to take place in the centre of the country, in the City de Brasilia, which has been the capital of Brazil since 1960. Brasilia is a new and very interesting city, declared by UNESCO to be a Historical and Cultural Heritage of Humanity, where one can see and appreciate the architectural marvels of Oscar Niemeyer.

That is why I urge you to accompany us at our forthcoming ICOLD CONGRESS.

Luis Berga.

The Dams Newsletter is published
by ICOLD-CIGB,
Central Office
151 boulevard Haussmann
75008 Paris
Tél. : (33) 1 40 42 68 24
Fax : (33) 1 40 42 60 71
Editor : Michel de Vivo
Managing Editor :
Emmanuel Grenier
Layout : Daniel Couvidat
Printer : Montligeon, 61400
ISSN n° 1990-4843