CIGB ICOLD

The Dams Newsletter

May 2016 #-15

Dams are a question of heart – better dams for a better world

Anton Schleiss,
ICOLD President

Looking at the financial markets and the recent revelations regarding offshore companies one can have the impression that the world economy is mainly controlled by financial speculations. Nevertheless, one should not forget that the soundness of the world economy strongly depends on investments and above all on the creation and maintenance of infrastructures. Among those, the hydraulic schemes or water infrastructure are decisive for any development. During several thousand years mankind has continuously developed techniques to use water and at the same time to protect itself from water. History shows that the economic prosperity of a society and its cultural wealth has always been closely related to the level of the development of the hydraulic schemes including hydropower and dams. In view of climate change, dams and reservoirs will and have to play an even more important role as mitigation and adaptation infrastructures in order to satisfy the vital needs in water, renewable energy and food in the different continents worldwide.

CONTENTS:

As I underlined during my inaugural speech as newly elected president ICOLD at the closing ceremony of the 25th ICOLD Congress in Stavanger in Norway, dams are a question of heart because:

H stands for health. Dams ensure water and which is the basis for health.

E stands for energy, which is required for developing the welfare of any society.

A stands for available and affordable.

R stands for renewable

T stands for trans-boundary and transportation. Dams are trans-boundary infrastructures that satisfy the needs of large communities and societies.

The ICOLD family is proud to contribute to a sustainable future for our young generation by fulfilling its mission. 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 is assisting nations to meet the challenges of the 21th century in the development and management of the world's water and hydropower resources. Water infrastructures are still urgently needed and they are and will be of fundamental importance in this century since they can really satisfy the human vital needs of water-energy-food.

For gaining wide acceptance and obtaining a win-win situation between all stakeholders such large water infrastructures projects have to be designed as multi-purpose projects by multidisciplinary teams with a complex system approach. This needs excellence in engineering sciences and management. It is a privilege for me to serve as president ICOLD since, trough the excellent work of his technical committees, ICOLD is contributing to the worldwide vision "better dams for a better world".

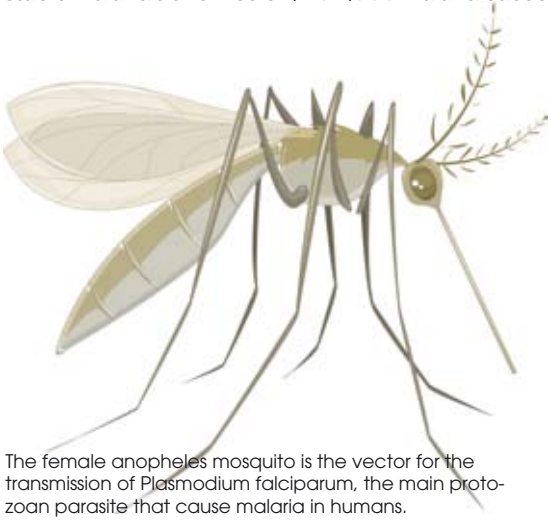
Malaria is the problem, not dams

by Emmanuel Grenier

Are dams contributing to the malaria epidemic? After scores of articles in the international media linking dams to malaria, it is necessary to remind some facts. There is more than meets the eye on the link between dams and malaria.

An article recently published in the Malaria Journal[1] has been largely used by dam opponents in their fight against new water storage infrastructures for development. The article itself is sound science, although limited : it does not investigate environmental factors such as climate, land use and other important factors for malaria transmission. It tries to quantify the impact of large dams on malaria.

The article concludes that, "In Sub-Saharan Africa, dams contribute significantly to malaria risk particularly in areas of unstable transmission. (…) In areas of unstable transmission, approximately 919,000 malaria cases per year were associated with the presence of the 416 dams. In areas of stable malaria transmission, 204.000 malaria cases per year were associated with the presence of the 307 dams."



The female anopheles mosquito is the vector for the transmission of Plasmodium falciparum, the main protozoan parasite that cause malaria in humans.

The conclusion is obvious: like any other water surface, the dams-created reservoirs are favoring the reproduction of anopheles mosquitoes and thus the transmission malaria. The authors do not mention it in their article, but the same is true for irrigation and urban water systems[2]. Before discussing this further, let's remind some important facts about malaria and the way humankind lived with malaria.

Some poorly known facts about Malaria

Malaria is of course a devastating sickness, a major killer which has made countless victims, including Alexander the Great, who died from malaria at 33. Alaric, the Goth which conquered Rome in 430 A.D. died shortly after from malaria. Many wetlands in the world were de facto excluded from development because the malaria killed too many people there.

At the end of the 19th century, the first task of the heirs of Louis Pasteur, when they arrived in Tunisia, was to conduct civil works in order to drain fields which were otherwise a breeding ground for mosquitos' development. At that time, you basically had to choose between water and safety from malaria. And this continued until the World War 2, when US began to use DDT, "the magic powder".

In 1939, Paul Müller, a biochemist from Switzerland, discovered the use of DDT for pest control. He received the Nobel Prize in 1948. During the postwar period, the use of DDT expanded with extraordinary results on the health: malaria, but also Dengue fever, typhus, yellow fever, etc.

1 - "Malaria impact of large dams in sub-Saharan Africa: maps, estimates and predictions" Malaria Journal 2015, 14 :339 Solomon Kibret et al. https://malariajournal.biomedcentral.com/articles/10.1186/s12936-015-0873-2

2 - The effect of Irrigation and Large Dams on the Burden of Malaria on Global and Regional Scale (WHO Report, 2005) http://www.who.int/water_sanitation_health/resources/ajtmhmalaria.pdf

The impact of large scale spraying of DDT was immediate: the number of new malaria cases was dramatically reduced. To give just one example, in Sri Lanka, there was 3 million cases per year in the 50s, with 12000 deaths. In 1962, after a successful DDT program, the number of cases declined to 31, with not a single death.

Enters Rachel Carson

The same year, a major campaign was launched against DDT by US biologist Rachel Carson, who published a book called Silent Spring, claiming that DDT would lead to the extinction of birds on USA territory and calling for its immediate banning. This led to the first environmentalist campaign on a global scale.

In fact most of the accusations on the health impact of DDT have been proven wrong. After seven months of hearings, the EPA concluded in 1971 that, "DDT is not a carcinogenic hazard to man. DDT is not a mutagenic or teratogenic hazard to man. The uses of DDT under the regulations involved here do not have a deleterious effect on freshwater fish, estuarine organisms, wild birds or other wildlife."

Despite that very clear statement, EPA administrator William Ruckelhaus reversed his own experts' decision and instituted a ban on DDT in USA. Ruckelhaus was a member of the Environmental Defense Fund and to the National Audubon Society, two major Environmental NGOs in USA at this time and two leaders of the anti-DDT fight. DDT production and spraying was forbidden in USA, which led to a major disruption in the public health uses of DDT elsewhere in the world.

Why such a focus on DDT?

DDT had become the absolute enemy of all environmentalists and one can ask why. Of course, there was the famous book, Silent Spring, but there was another underlying cause.

Michael McCloskey, the leader of the oldest environmentalist organization, gave us a clue about that underlying cause when he declared in 1971: "The Sierra Club wishes the ban of pesticides, even in the countries where DDT enabled malaria control."

Prince Philip of England, WWF International President for more than 25 years and a renowned green activist, explains more accurately :

"I was in Sri Lanka, where malaria was controlled thanks to DDT. What people did not realize, is that malaria was controlling population growth. The consequence was that population doubled in 20 years."

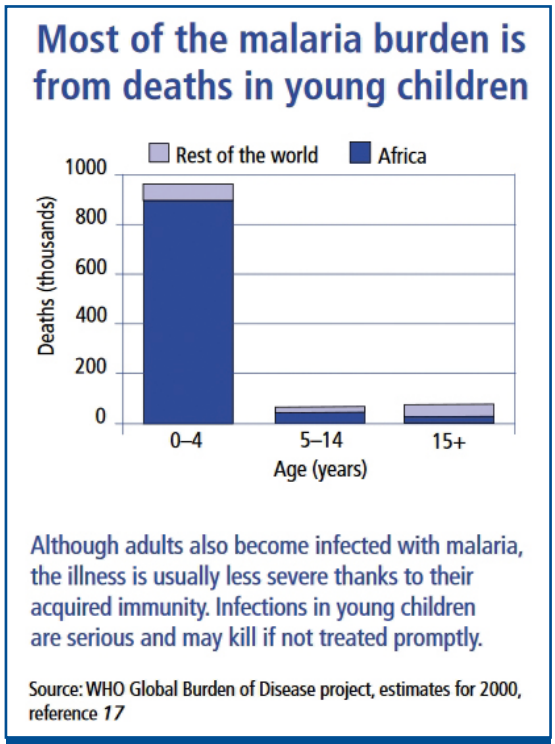
Alexander King, the President of the Malthusian Club of Rome wrote in 1990 that "retrospectively, my main quarrel with DDT is that it strongly worsened the population growth problem". Captain Cousteau, the famous French environmentalist dubnamed "Captain Planet" at the Rio Earth Summit in 1992, said more bluntly : "it is terrible to say but world population must stabilize and for that, we need to eliminate 350 000 people per day."

For most of the environmentalists, population growth and human beings in the developing sector are the major enemy of Mother Earth. Thus life-savings DDT became also a major enemy, since it created the conditions for population growth in India or Africa.

The DDT ban immediately created an upsurge of malaria in India, Sri Lanka and Africa, in all countries which could not afford the substitutes. In Sri Lanka, the number of cases jumped again to 2 millions of cases.

The fight around the DDT continues in the 2000s

Since that time, there was a furious fight between environmentalist organizations and the UN World Health Organization about the DDT, which culminated



Half of the World population is exposed to the risk of contracting malaria. According to the last published estimations from WHO, there was 214 million cases of malaria in 2015 and 438 000 deaths. Most of them are in Sub-Saharan Africa (192 million cases and 394 000 deaths) and are concerning children under 5. (the figures from the graphic are not updated, since they are from 2000, but the proportions are the same today).

A UNDP program against malaria

in the 2000s with the POP Treaty. The former wanted to ban a list of 12 persistent organic pollutants (POP), including the DDT. The latter agreed but wanted to continue the use of DDT for health applications (not for agriculture, a sector with much larger volumes). WHO argued on this matter that the certain health benefits of maintaining DDT use for indoors spraying were much larger than the hypothetical health benefits of banning DDT.

WHO and developing nations, led by China and South Africa, eventually won the battle to save DDT. Between 2000 and 2015, malaria's incidence decreased by 37% globally. The number of new cases is continuing to decrease but there was still 214 millions of cases in 2015, leading to 438 000 deaths. Most of these cases are affecting Sub-Saharan Africa, which counts 192 millions of cases and 394 000 deaths in 2015.

Despite this success, Environmentalists NGOs (including the World Wide Fund for Nature) continue to fight against DDT and, through misrepresentation of science, have somehow succeeded in reducing its use. This is mentioned in the last WHO report on malaria, which states:

"Despite its initial widespread use and contribution to the success of malaria eradication and control efforts, in recent years, the use of IRS [indoor residual spraying] has declined. This is due in part to lack of government commitment and financing to sustain these efforts over the long term and to concerns about insecticide resistance and community acceptance. However, another important factor has been general disapproval of DDT use, due to fears of its harmful effects on the environment and on human health, fears which are unjustified when DDT is used appropriately for IRS"[3] .

Thus, it is probable that the impact of anti-DDT NGOs on the malaria is substantially higher than the impact of large dams. The malaria problem has been here for hundreds of years, with or without large dams. There is more malaria around wetlands and rivers, that does not mean we should suppress wetlands and rivers!

Although the dams have a proven local impact on malaria, their positive effect on health and development is so great that they should be built despite this local impact, with greater care for anti-malaria programs. The authors of the paper say that "the cumulative burden imposed by large dams is major". But their own figures show it's not the case: they calculate that 1.1 million malaria cases can be attributed to large dams in Sub-Saharan Africa, but this is out of a total of 192 million cases for the same region.

According to WHO, some 850 million people live in the close vicinity of irrigation systems and 20 million near large dam sites worldwide. In sub-Saharan Africa, which has 88% of the current global malaria burden, only 9.4 million people are living near large dams and irrigation sites. In contrast, the remaining sub-regions with malaria transmission concentrate of 15.3 million people near large dams and 845 million near irrigation sites, but they represent only 12.1% of the global malaria burden. The authors of the paper rightly say: « Whether an individual water project triggers an increase in malaria transmission largely depends on the epidemiological setting and socio-economic factors, vector management and health seeking behavior".

The really important fight against malaria is thus not a fight against dams, but for mosquito control and socio-economic development.

Let us conclude by quoting the wise conclusion from the authors of the paper, very different from the catastrophist tonality used by the media which covered their article : "We conclude that, particularly in unstable malaria endemic areas, a combination of integrated malaria control measures and sound water management is essential to reduce the current burden of malaria in locations near irrigation or dam sites sustainably. It is also crucial to include comprehensive health impact assessment (HIA) procedures in the planning of all water resources development in malaria endemic areas." This is clearly something that the dam specialists in Africa must take into account.

3 - « Indoor residual spraying », Global Malaria Program. WHO 2006. http://apps.who.int/iris/bitstream/10665/69386/1/WHO_HTM_MAL_2006.1112_eng.pdf

President Anton Schleiss answers the Science magazine.

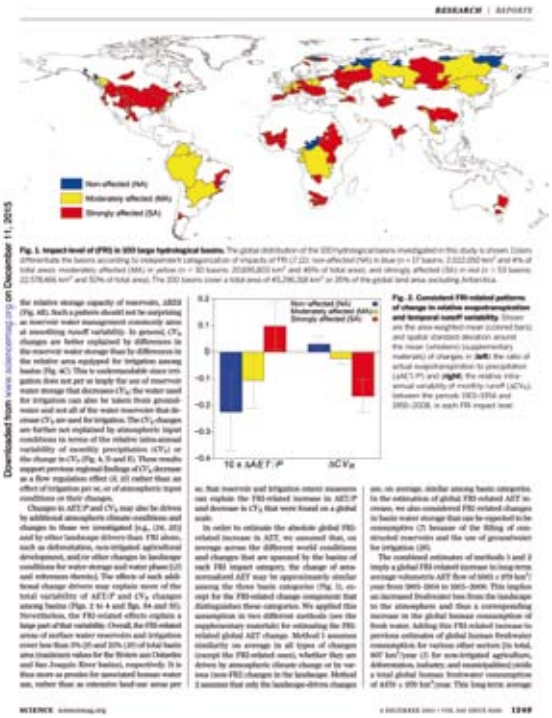
Science has published an article titled: "Local flow regulation and irrigation raise global human water consumption and footprint", which covered by the news media along the line that "Global freshwater loss due to dams, irrigation much larger than previously thought"

The authors claim that: "Flow regulation and irrigation alter local freshwater conditions, but their global effects are highly uncertain. We investigated these global effects from 1901 to 2008, using hydroclimatic observations in 100 large hydrological basins. Globally, we find consistent and dominant effects of increasing relative evapotranspiration from both activities, and decreasing temporal runoff variability from flow regulation. The evapotranspiration effect increases the long-term average human consumption of fresh water by 3563 ± 979 km^3/year from 1901–1954 to 1955–2008. This increase raises a recent estimate of the current global water footprint of humanity by around 18%, to 10,688 ± 979 km^3/year. The results highlight the global impact of local water-use activities and call for their relevant account in Earth system modeling."

ICOLD President Anton Schleiss sent a comment to Science as follows:

The authors recognize that reservoirs created by dams are vital infrastructures to satisfy the needs in water, energy and food in the different continents worldwide. History shows that the economic prosperity of any society and its cultural wealth has always been closely related to the level of the development of the water infrastructures including dams and reservoirs. The results of the authors study highlight without doubt the global impact of local water-use activities and call for their relevant account in Earth system modeling. Nevertheless the authors do not mention that the increased relative evapotranspiration may fall again locally as precipitation. Thus the effect of the man-made reservoirs on the global water footprint cannot be estimated by the method of the authors. Finally another problem is the question of the reference system. Since a long time ago river training works have channelized rivers resulting in a significant reduction of floodplains with high evapotranspiration. Irrigated areas and reservoirs may compensate this again today.

Local flow regulation and irrigation raise global human water consumption and footprint



Flood control dams prevented $91M in damage in Oklahoma

by Emmanuel Grenier

Economists studies on the impact of large dams often overlook the flood protection aspect. It is useful to remind that dams are costing a lot of money for the initial investment, but they also save a lot of money by producing clean and unexpansive power and by protecting populations against the devastating effects of floods. Something illustrated here in a state from USA.

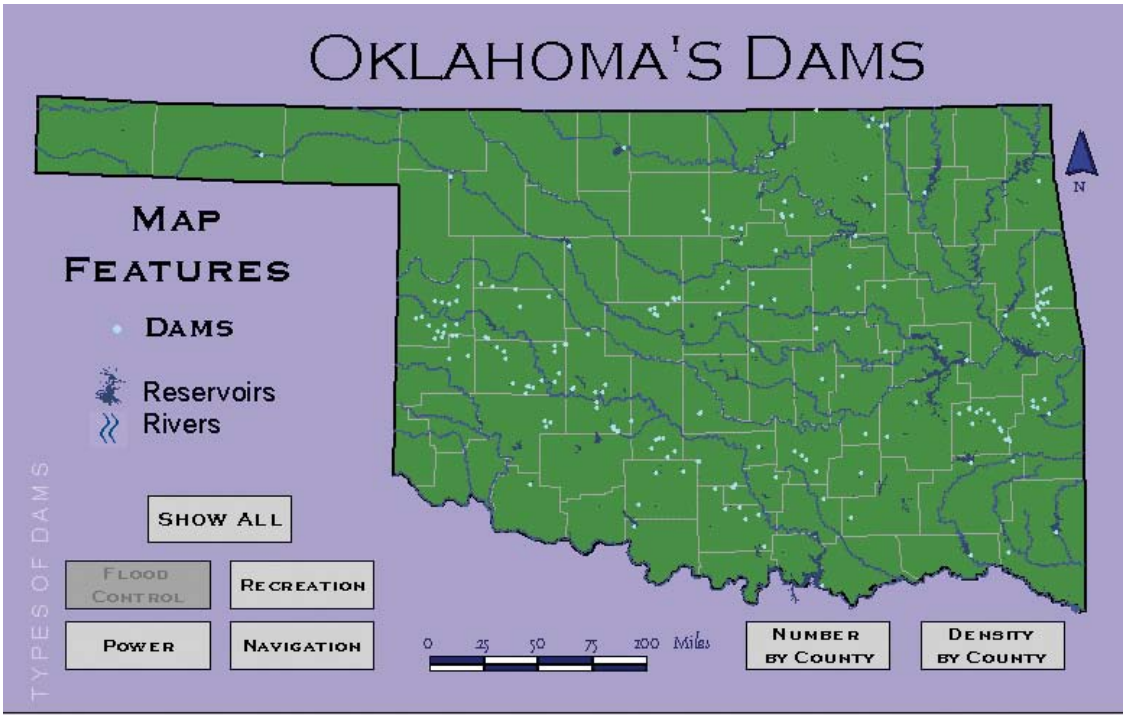
The flood protection effect of dams is often forgotten by the economists who study the benefits of dams, or those who deny them, like those from the Said Business School of Oxford.

Floods are among the main negative impacts from nature, which give the impulse for a decision to build dams. Thus, the largest dam in the world, the Three Gorges Dam, was not only built to produce power, but to protect the riparian populations from the Yang Tse, which were regularly and severely affected by the floods.

The building of the Three Gorges Dam forced the displacement of 1.4 million people which lived on the site of the reservoir created by the dam, but it also saved millions of people from having their houses and cities destroyed by the untainted river.

Although this is a well-known fact, there are not always precise calculations to prove it. It's interesting to examine a precise local case. A USA federal agency has calculated that flood control dams in the state of Oklahoma prevented $91 million in damage during a flooding episode which took place last year in May 2015.

Over 2,000 flood control dams across the state prevented $91 million in damage in the month of May alone, according to the USDA Natural Resources Conservation Service (NRCS).



Robert Hathorne, Oklahoma Conservation Commission Public Information Officer, said the number is quite conservative, as it is calculated based on numbers from an audit done over 50 years ago.

When the areas around the watershed were surveyed, he said, they did not include some of the infrastructure or housing that is now in the area. The $91 million prevention in damaged does include an inflation calculation, but does not include any new infrastructure, said Hathorne.

The flood control dams are designed to retain water during heavy rainfall events and then release the water slowly to prevent downstream flooding, which can damage land, homes and businesses. Upstream flooding can occur when the lakes back up, but that is contained within the flood pool incorporated by design and identified as easements on land records.

"Many of these structures were designed so long ago that many people are unaware they were built as flood control dams — they think they are farm ponds," Hathorne said. "People don't know how they function and where the water is supposed to go when it floods, so they might build a structure within a flood pool.

The USDA Natural Resources Conservation Service said the following five watersheds were responsible for the most damage prevented:

- -Spring Creek watershed, Caddo County, four dams, 16.4 inches of rain, $7 million in damage prevented
- -Sugar Creek watershed, Caddo County, 51 dams, 16 inches of rain, $5.4 million in damage prevented
- -Wildhorse Creek watershed, Carter, Garvin, Murray and Stephens counties, 107 dams, 15.7 inches of rain, $4 million in damage prevented
- -Rush Creek watershed, Garvin, Grady and Stephens counties, 54 dams, 15.6 inches of rain, $3.2 million in damage prevented
- -Big Wewoka Creek watershed, Hughes and Seminole counties, 41 dams, 18.4 inches of rain, $2.4 million in damage prevented.

SAID

(SmArt water management with Integrated Decision support systems)

by Eric Mino and Maroua Oueslati

In the Mediterranean region, dams play an essential role for irrigation, drinking water supply, energy production and flood risk regulation; however, the optimal management of dam functions is still complex. In this context, SAID project proposes a set of tools and monitoring networks based on the concept of a platform for integrated management of water infrastructures which includes flood risk control, water quality, energy management (both consumption and production). SAID is a European project co-funded by the European Commission under the 7th Framework Program, and it started on January 1st, 2014 for a period of 36 months. The project is a collaboration between four European countries: Spain, Germany, Portugal and France.

The objective of SAID project is to involve the final users and the SMEs in order to improve the production and deployment of smarter water management systems in Europe. The project focuses on the deployment and evaluation of a complex demonstrator, composed by several heterogeneous and innovative DSSs using historical data, satellite datasets and real-time monitoring covering the dam and the river basin. This demonstrator, in the south of Spain, represents many similar basins in Europe, and it is based on cutting-edge DSS technologies in three areas:

Flood risk control (including the optimization of dam management) DSS based on Hydroview, which is a GIS-based application that exploits two complementary simulation models to reproduce the behavior of a river basin: WiMMed, a physically-based distributed hydrological model and Guadalfortran, a one-dimensional hydrodynamic code.

Water Quality Management DSS: it delivers its results combining two software modules: a web monitoring application, to address the storage and assessment of large time series of monitoring data, and WiMMed, for the adequate reproduction of the pollutant loads from the river basin and into the reservoir: the Monitor is a cloud application for real-time analysis of measured water consumption and quality, supported by a geographic information system for easy geo-location of network elements and events. The WiMMed Reservoir module adequately reproduces the substances dynamics within reservoir water body. Through this module it is possible to obtain simulated series of inflows and outflows, besides values of substance concentration in a distributed way.

Energy management (energy production and energy consumption) DSS; it aggregates all the data related to energy generation at a dam and allows planning the best management strategy to assure its production objectives taking into account all the other constraints (such as flood risk and water quality). Given a certain production target and considering the reservoir current volume, this DSS is able to schedule productions for the next week in order to meet the target using the most valuable energy price hourly slots.

Another innovation is the integration of these DSSs into a web application unifying the information necessary for dam management. Beyond these software applications, the projects also developed a full set of communication appliances allowing robust, low energy and long distance data exchange with sensors for in-situ monitoring network.

Further information on http://said-project.eu/

The Water System Heritage

by Emmanuel Grenier

The World Water Council (WWC) and the International Commission on Irrigation and Drainage (ICID) have launched a common initiative aiming at establishing a World Water Systems Heritage Program, based on the model of UNESCO's World Heritage Program

Where does it come from?

The initiative was launched in Korea, during the 7th World Water Forum, by a Japanese engineer from the Japan Commission on Irrigation and Drainage. Mr Kazumi Yamaoka, Governor from WWC, remarked that UNESCO had established World Heritage Program, followed by the Intangible Cultural Heritage Program and the Memory of the World Program. He also noted that Food and Agriculture Organization had established the "Globally Important Agricultural Heritage Systems" Program. Finally, ICID had just launched the Heritage Irrigation Structure (HIS) program.

However, he noted that none of those programs placed a high value on people's groups and organizations as well as regimes and rules, which have managed water systems for generations.

ICID President Gao Zhanyi first circulated the proposition during the 51st WWC Board meeting in 2014.

What is it

WSH is a global initiative to properly value the wisdom and energetic activities of people centered groups/organizations with their rules and practices contributing to peace keeping and socio-economic development in the region through sustainable management of water systems for over generations. A typical candidate would be the Subak system, in Indonesia, that was part of the technical visit in Bali ICOLD meeting.

More generally, the nominated institution should be a people's group/organization managing water systems and having demonstrated sustainable management for at least a hundred years. The institution should have contributed to socio-economic development in a given region, through sustainable management of water system. Finally the institution should have involved many stakeholders besides experts and authorities

The WSH program is proposed as an activity that is carried out through actions on voluntary initiatives of related international organizations in a manner

The participants to the March 16 meeting in New Delhi. From left to right : Alireza Satamat, UNESCO Regional Center, Emmanuel Grenier (ICOLD), Avinash Tyagi (Secretary General, ICID), Saeed Nairizi (President, ICID) Dale Jacobson (American Society of Civil Engineers), Kazumi Yamaoka (Japan, WWC governor), Henk van Schaik (International Council on Monuments and Sites)

similar to the programs run by UNESCO and FAO. The WSH would be run by WWC and ICID, in co-operation with UNESCO, FAO and other interested global institutions like ICOLD.

Institutional framework

The main bodies of the Program will be an International Committee (IC) and a Technical Advisary Committee (TAC).

An important mandate of the WSH is that the Program is not only turned toward the past, but also, and still more so, toward the future. The main interest is so learn from the past to build a better future with better water management systems.

The broad terms of reference of IC is to manage the program, lay down its rules and regulations, and oversee mechanism for dissemination of the wisdom culled out of the recognized WSH.

The participants to the March 16 meeting in New Delhi. From left to right : Alireza Satamat, UNESCO Regional Center, Emmanuel Grenier (ICOLD), Avinash Tyagi (Secretary General, ICID), Saeed Nairizi (President, ICID) Dale Jacobson (American Society of Civil Engineers), Kazumi Yamaoka (Japan, WWC governor), Henk van Schaik (International Council on Monuments and Sites)

How will ICOLD contribute to WSH?

ICOLD will nominate a representative at the Technical Advisory Committee (TAC), which will be in charge for reviewing the candidatures and advise the WSH Program.

A tentative list of the TAC includes : ICOLD, International Water Resources Association, International Water Association, International Network of Basin Organizations, International Water History Association, Dr Kuang Shangfu, President of China Institute of Water Resources and Hydropower Research (IWHR), Mr Kazumi Yamaoka, Japanese Ministry of Agriculture and Forestry, Zhang Zhirong, National Water Museum of China, Alireza Salamat, Deputy Director of UNESCO Regional Center on Urban Water Management (Teheran).

The TAC will have the crucial role to develop a criterion “to assess the value of the water management system” to be potentially recognized as Water System Heritage.

The meeting on March 16 in New Delhi, in ICID headquarters, was a Preparatory Meeting for giving final shape to the World System Heritage Program. The Program scheme resulting from that meeting will be put up to World Water Council Board of Governors, during its 59th Meeting in June 2016 to approve the program.

The WSH Program may be formally launched at the 20th Anniversary of WWC in Marseilles in November 2016.

The ICOLD family is morning her Nicole


Nicole delivering ICOLD distinction to her mother Mrs Chapelle, during Madrid ICOLD Congress in 1973


Nicole at her desk in 2006

Nicole Schauner passed away on March 22. Immediately after the news went out, messages from all over the world poured in the Central Office to celebrate her exceptional qualities, both professional and personal.

During the speech he pronounced during the funerals, Secretary General Michel de Vivo testified that "Nicole was not only my assistant and the assistant of other Secretary Generals before me, she was the heart of ICOLD to whom where sent all kind of requests, complaints, documents from all over the world. She was answering them hastily, in one of the four languages she mastered, with elegance, finesse and diplomacy."

Having worked 50 years for ICOLD, she was a living memory and a precious adviser on sensible matters concerning the life of the Commission. When International Congresses of ICOLD were coming closer, she was becoming a real maestro, bossing around scores of senior engineers and experts from all over the world in order to ensure the success of the meeting.

When she retired in 2012, at 70, she asked to have a small computer in order to continue to work from home. For her, as for her mother Mrs Chapelle or her daughter Nathalie, ICOLD was a vocation, no way to stop working!

All those who had the privilege to work with her can testify that her professional efficiency did not stop her from laughing. Working with her was thus always a pleasure.

The whole ICOLD family will miss here as a family misses a mother.

For the kindness she was radiating, for the love she distributed around her, for all the work accomplished for ICOLD, we must say a giant "Thank You" to Nicole. A tribute to her will be delivered during the next annual meeting in Johannesburg.


Nicole relaxing during a cruise on Halong Bay, before Hanoi annual meeting.

25th Congress of ICOLD in Stavanger (Norway)

Part of the ICOLD Board during the ICOLD Board during the Stavanger General Assembly : from right to left, Secretary General Michel de Vivo, President Adama Nombre, Vice-President Andy Zielinski, Vice-President Leif Lia, Vice-President Kyung-Taek Yum.

The country of Hydropower

"Come to Norway and feel the power" was the slogan for the annual conference of the International Commission on Large Dams (ICOLD) coupled with its 25th Congress. More than 1000 dam experts from around the world (they came from some 90 different countries) met in Stavanger to discuss new scientific data, technical and environmental challenges. As is usual in ICOLD meetings, they took the occasion to share knowledge and experiences about dams and hydropower more generally.

Norway is often presented as the country of hydropower. More than 90% of its power comes from hydroelectricity. With its 4000 river courses and 250 000 lakes, Norway is a blessed country when it comes to electricity production from hydropower. An installed capacity of 27 000 MW ensures that virtually all electricity consumption is covered from hydropower. Hence, hydropower is one of Norway´s most important natural resources. This has been an important factor in the favorable economic development of the country for the last century.

Hydropower is the largest source of renewable energy in the world and has wonderful qualities, being clean, emission-free and adjustable. This means the water can be stored in reservoirs and used when needed, representing thus the only way to store huge amounts of electricity. In Scandinavia, Norwegian hydropower plays a crucial role to replace dirty power from coal plants of Denmark and to equilibrate intermittent renewables (wind and solar power).

While large parts of Europe were largely industrialized through the use of coal, hydropower has been at the core of the building of Norway as an industrial nation.

25th Congress

ICOLD 25th Congress discussed four major questions related to Innovation in utilization of Dams and Reservoirs, Spillways design (considering uncertainties in floods evaluation, gates ...

Newly elected Vice-President Ahmed Chraibi addresses the General Assembly

Vlady France Conseil

Newly elected Vice-President Michael Rogers addresses the General Assembly

related incidents and extreme floods management), Embankment Dams and tailing Dams (considering the new development in very high rockfill dams, innovative design in embankment dams, risk related to foundations and interface between concrete and earth works) and finally Upgrading and re-engineering of existing dams and reservoirs, to extend and improve the services provides by these long lasting infrastructures. Dams can provide services for centuries and sometimes for a millenary so there is a need for a continuous improvement of the dam's structures and functions.

The presentations on those four questions are now available for free on ICOLD Website :

http://www.icold-cigb.org/GB/Publications/others_publications.asp

During the General Assembly of ICOLD which took place before the Congress, Pr Anton Schleiss, from Switzerland, has been elected as new ICOLD President until the 2018 Congress in Vienna. He succeeds Adama Nombre, from Burkina Faso, who becomes Honorary President. Anton Schleiss is the director of the Laboratory of Hydraulic Constructions at the Swiss Federal Institute of Technology of Lausanne. He published six books and more than 500 science and technology papers. He is largely recognized in the international community of specialists of hydraulics and water resources, as witnessed by his election as a member of the council of the International Association for Hydro-Environment Engineering and Research (IAHR). 2 new Vice-Presidents were also elected: Ahmed Chraibi (Morocco) and Michael Rogers (United States).

ICOLD supports Hydro 2016

International Conference and Exhibition
will take place in Montreux, Switzerland
10 - 12 October, 2016

Water Storage and Hydropower Development for Africa

will take place in Marrakech, Morocco
14 - 16 March, 2017

85th Annual Meeting of ICOLD

will take place in Prague, Czech Republic
3 - 7 July, 2017

26th Congress & 86th Annual Meeting of ICOLD

will take place in Vienna, Austria
1 - 7 July, 2018

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