



INITIATIVES POUR L'AVENIR
DES GRANDS FLEUVES
INITIATIVES FOR THE FUTURE
OF GREAT RIVERS

Executive summary



The place and role of the river in energy transition and in the response to climate change

1st session

13-15 October 2015 – Lyon

Initiatives for the Future of Great Rivers

Founded in 1933, CNR has developed a global thus [integrated](#) vision of the river: energy production, river transport and irrigation.

To mark its eighty fifth anniversary, Elisabeth Ayrault, its Chairwoman and CEO, decided to launch the *Initiatives for the Future of Great Rivers* in view to [promoting exchanges of ideas and good practices between river managers, institutional representatives and international experts](#).

The “Initiatives” are destined for deployment in many forms. The bi-annual sessions take place successively in Lyon and in one of the countries crossed by the rivers studied. These meetings will be completed by a “research and innovation” section concretised by the reception of start-ups and PhDs working on themes related to rivers. An “education” section is also in the process of being launched to make the young aware about these issues.

13-14-15 October 2015: the first meeting

The first meeting brought together 16 members, either representing countries crossed by rivers (the Ganges, the Brahmaputra, the Mekong in Asia; the Senegal in Africa; the Parana in South America; and the Saint Lawrence in North America) or with acknowledged expertise in questions relating to rivers. The first two days were taken up by working sessions and completed by a visit to CACOH, CNR’s Hydraulic Structure Behaviour Analysis Centre. To widen the debate and in keeping with the IFGR’s missions, the interested parties of the Rhone Valley (elected representatives, industrial companies, NGOs, etc.) were invited to react to the conclusions of the session.

The choice of the Musée des Confluences to host the three days echoed the goal underlying the “Initiatives”: more than an observatory, it is an [arena of exchange and proposals for concrete action on rivers, at the confluence of different analyses](#).

1- Rivers and climate change

The theme dealt with by the first session of Initiatives for the Future of Great Rivers was “the place and role of the river in energy transition and in the response to climate change”.

In view of the COP21, the panellists expressed their concerns: despite generalised awareness – from public institutions to companies and individuals – of the need to act, **rivers remain absent from the discussions** whereas they are **both fragile ecosystems and levers for action**.

Faced with the depletion of resources, melting ice caps and rising sea levels, growing competition for the use of water, and the environmental issues that development schemes raise, this issue can no longer be evaded: **Can we ensure the sustainable management of rivers, to make them a foundation for a new model of development?**

- Multidisciplinary exchanges -

The pertinence of the dialogue between a wide range of expertise and between different territories of the world was evident:

- The actors are faced with the same problems, from Bangladesh to Canada
- Rivers cut across national borders, thus implying transnational management.
- Whether the problem is to protect populations against floods, develop irrigation or river transport, **what is most important is to understand the river as an ecosystem by integrating all its uses.**

Complementary transversal visions, stemming from hydrology, climatology and anthropology, fuelled reflection by providing the **conclusions of scientific studies** on which to base opinions, and above all by standing back and **constantly questioning our certitudes and rationales for action.**

These three days of exchange confirmed the acuity of the **structural problems** facing river managers:

The river faced with the increased risk of natural disasters

Bangladesh, whose population face floods on a daily basis (97% of the country was flooded in 1997 and 40% in 2004), is directly affected by the impacts of climate change: **the rising sea level**, estimated at 1 meter, is equivalent to the loss of 25% of the country's land, while the **melting snow in the Himalayas** aggravates the frequency of devastating floods. River deltas are the granaries of Asia, but they take the full brunt of climate change and the reduced inflow of sediment caused by river developments.

The river confronted by increasing needs: a major strategic resource

The need for energy and food independence: for landlocked countries such as Paraguay and Laos, the river is a priceless energy resource. The annual hydroelectricity production of the Itaipu dam, shared between Brazil and Paraguay, amounts to the equivalent of Argentina's total electricity consumption. Its benefits also lead to considerable redistribution in the surrounding territories, sometimes representing 80% of municipal budgets. **What is the cost of inaction** for these countries? Likewise for access to water for human consumption and agriculture. Whereas each person in the United States can count on average on 5,000 m³ of water stored in dams, African countries can only provide 3 m³ of water per person. The rich countries share a **responsibility** in the capacity of the poorest countries to continue their development.

The need for exchanges: in a context of globalisation and faced with ever increasing international trade, road transport remains the main means of shipping goods. However, solutions exist, starting with river transport, which suffers from severe underdevelopment internationally given the density of waterways, in South America for example.

These trends go hand in hand with other challenges such as [water pollution](#). Although one of the main causes is the lack of water treatment facilities, the panellists are aware that river transport also contributes to greenhouse gas emissions and water pollution. Furthermore, it was recalled that 70% of the contamination affecting the oceans stems from the fuels discharged into the seas via rivers. [Unchecked urbanisation](#) is another challenge that attracts populations to settle in hazardous areas or to occupy arable land.

The river at the heart of a change of civilisation

At base, these challenges underpin the model of development that we will choose for the years to come.

Major development schemes that modify the hydrological continuity of a river raise the question: Shouldn't we combine the scheme of large centralised dams with [decentralised energy production](#), at local and even individual scales?

Many forces, dealt with in-depth during the debates, push in this direction:

- The [multiplication of possible energy sources](#), their miniaturisation, and digitisation;
- Frontiers are disappearing, cities and territories [rival each other increasingly](#) to attract activities, with the role of private actors in the ascension;
- The [expectations](#) of the community and elected representatives are changing, the needs of the land bordering rivers are greater, thus changing the responsibility of river managers;
- [The legitimacy of governments and democratic representation is contested](#), in line with the desire of the community and NGOs to play a role in the decisions involving territorial development. This refusal of top-down, centralised decision-making imposed on territories, leads to the need [to increase mutual understanding between the stakeholders of the river](#).

The river lies at the heart of paradoxical upheavals. The constant growth of needs and trade and the permanent reduction of prices for energy and raw materials, run counter to the rationales of decentralisation and lower consumption. In line with the trend that anthropologists call "glocalisation", the debates confirmed that rivers must be understood individually, as the interface between the "global" and a local context that is historically, economically, sociologically and culturally specific.

2- Shared convictions

In support of decision-making authorities and in constant interaction with academic institutions, professionals and civil society, IFGR's members are convinced that action is necessary [in consensual concentric circles](#).

Five categories of action were defined:

- 1- [Links between the unacceptable and non-accepted](#). The human tragedies caused by floods are especially unacceptable since they are often caused by the non-accepted: we refuse risk and building in floodable areas.
- 2- [Knowledge](#). Research must be supported. A culture of rivers must be disseminated, in schools (primary schools and high schools), to teach children to discover how to live together with water in mind.
- 3- [Advocacy](#) built around basic principles: shared management, solidarity between upstream and downstream, the importance of deltas, and the integration of all the stakeholders.
- 4- [The possibilities](#). Use models to visualise what can be done at both technical and institutional levels. Technical solutions and river management authorities exist that can serve as models and be duplicated.

- 5- **Dialogue with NGOs.** The day of exchanges on 15 October proved the pertinence of associating all the actors. The otter, fish, promoter and farmer are all stakeholders that express themselves in one way or another. A river is like a parliament of stakeholders: what is the Republic of this democracy?

3- Actions to be implemented

On the basis of these shared convictions, the members of the Initiatives for the Future of Great Rivers succeeded in declaring a series of solutions, ranging from regionalised initiatives to the launching of sociocultural reflection on the place of the river in our societies.

Four themes were chosen for this initial meeting: floods / urban development, hydroelectricity production and energy models, navigation, irrigation and agriculture. Certain themes like fighting water pollution were dealt with transversally.

These subjects all form paths of action, making it possible to list concrete responses to the challenges facing rivers. Who is responsible for the floods? How can hydroelectricity production be a lever for energy transition? Does river transport belong to the past or the future? How can agricultural development rely on a new mode of river management?

PATH 1: Combating floods

Theme	Logic of action
<i>Alert methodology</i>	Develop in parallel forecasting and alert procedures , by duplicating prevention systems (sensors, transmission methods) that exist in other fields such as volcanology or earthquakes, and by exploring evolutions towards the smart city .
<i>Urban resilience</i>	Improve urban planning tools to adapt to a constantly changing environment: we must imagine flexible urban planning, able to integrate the unpredictability of the river. Take into account all the factors responsible for non-compliance with urban planning regulations (localisation of employment zones, etc.).
<i>Social resilience and Memory</i>	Seek social resilience by making the communities learn from past disasters Root in the collective memory the disastrous effects of previous floods to fight against the effect of a kind of “Alzheimer’s disease” relating to property development.
<i>Governance responsibility and</i>	Work on the global management of different uses Increase solidarity between upstream and downstream by setting up a regional approach.

The IFGR members want:

- the creation of a “flood WHO” responsible for developing prevention systems, by studying in particular the opportunities made possible by NICTs;
- more dynamic planning, through the creation of buffer zones between cities and rivers, and through the choice of more resilient means ;
- to spread alert procedures by organising drills;
- to maintain visible traces of past disasters.

The IFGR members act:

- in the short term, by placing the river and its history at the centre of concerns;
- in the medium term, by listing alert procedures in a “catalogue of possibilities”.

PATH 2: Re-evaluate the potential of hydroelectric energy

<i>Theme</i>	<i>Logic of action</i>
<i>Synergy between renewable energies</i>	<p>Study the lever effect of hydroelectricity on energy transition, by enhancing its advantages:</p> <ul style="list-style-type: none"> ○ 100% renewable energy without greenhouse gas emissions; ○ maturity that permits the exploration of innovative technologies at the core of tomorrow's energy systems (energy storage: power to gas, hydrogen, synergy with other renewable energies). ○ a financial resource that can be redistributed in the territory.
<i>Energy systems</i>	<p>Place hydroelectricity in the service of tomorrow's economy by developing decentralised systems, while seeking synergies with traditional systems.</p> <p>Integrate flexibility in the design of structures, to permit the integration of continuous improvements to preserve the river's hydrological continuity.</p>
<i>Social responsibility</i>	<p>Increase the impacts of redistributing the profits generated by hydroelectricity and the transparency concerning them, to meet the emerging demands of regional authorities and other river users.</p>

The IFGR members want:

- impact studies that integrate the environmental, economic and social consequences of development schemes to be carried out.

The IFGR members act:

- In the short term, by supporting R&D:
 - to design decentralised systems that can be combined with existing ones;
 - to build more flexible structures capable of incorporating technologies that reduce their impacts on fauna and flora (e.g., solutions designed to help the upstream and downstream passage of fishes).

PATH 3: Relaunch river transport

<i>Theme</i>	<i>Logic of action</i>
<i>Environmental efficiency</i>	<p>Stimulate river transport, especially over short distances, by re-inventing river logistics to make it more competitive.</p> <p>Maximise its energy efficiency.</p>
<i>Governance</i>	<p>Reduce geographic and functional fragmentation, by pursuing efforts to forge multilateral partnerships.</p>
<i>The link between the city and the river</i>	<p>Integrate river transport with a genuine territorial project including the economic dynamics of the future (industrial ecology, circular economy) and the social and cultural expectations of populations.</p> <p>Re-evaluate the tourism potential of the river.</p>

The IFGR members want:

- the use of concepts such as industrial ecology in territorial development projects, in order to **re-focus activities along rivers**.
- the formulation of an energy performance indicator for boats in the same way as for buildings.

The IFGR members act:

- by forging links with the academic world:
 - in the short term, by studying the existing literature on the links between the city and the river from the environmental, urban, economic, political, poetic and administrative angles;
 - in the medium term, by publishing a **report that links the current situation with the potential situation**.
- In the medium term, by carrying out a comparative analysis of institutional and legal frameworks and by considering the creation of a single window, i.e. a common authority that covers the different technical issues relating to the river.

PATH 4: Support agriculture

Theme	Logic of action
<i>Water and land management</i>	Present agriculture as a solution for food security, and for optimal resource and flood management. Initiate agricultural policies based on optimal resource and land management .
<i>Deltas</i>	Place this theme on the international political agenda.
<i>Urban/rural balance</i>	Encourage a new “urban exodus” by making agriculture an attractive life choice, notably through new irrigation methods acquired by sharing good practices.

The IFGR members want:

- to preserve deltas, the “world’s granaries”, notably by performing operations to restore mangroves;
- to improve wastewater treatment.

The IFGR members act:

- in the medium term, by identifying innovative irrigation technologies and their costs;
- in the long term, by supporting agronomic research and by assisting experiments with demonstrations.

TRANSVERSAL ACTIONS:

The IFGR members want:

- to increase mutual understanding between the river’s stakeholders and reform modes of decision-making.

The IFGR members act:

- In the short term
 - by studying existing decision-making procedures in other areas in order to adapt them to water management;

- by starting up a benchmarking system relating to small, daily decision-making by organisations, in addition to institutional decision-making;
 - through understanding the link between the city and the river from the standpoint of the river.
- In the medium term
- by working on the daily management of sediments and flushing;
 - by exploring the complementarities with the existing Massive Open Online Courses (MOOC) devoted to river management;
 - by creating a type of parliament for the stakeholders linked by the river.

On the occasion of the COP21, the IFGR launch 7 initiatives:

- 1- Relaunch river transport
- 2- Reassess the potential of hydroelectricity
- 3- Combat flooding together
- 4- Treat wastewater before discharging it
- 5- Protect the ecosystem needed for fishes
- 6- Share good practices on irrigation
- 7- Defend deltas

Conclusion

The river, the cradle of civilisations, has for centuries been an element that unites societies. On the basis of this philosophical premise and through its different uses, the river invites us to envisage climate change [as a challenge and an opportunity to rally and innovate](#).

By acting together outside administrative and functional borders, the IFGR members are also convinced that the benefits of the river exceed those derived from its use alone, and that it is a [vector of peace](#), as has already been demonstrated by examples such as the OMVS in Africa.

Rivers teach us that populations, by choosing to harness them for electricity, navigate along them and trade along their banks, have already gone beyond national confrontations. This is clearly the challenge of the COP21: to place emphasis on what links us together. The river is both the symbol and the example.

Provided that it is placed near the top of the international agenda, the river can be a driving force for action and mobilisation for the climate.

[The next session of the *Initiatives for the Future of Great Rivers* will be held in Montreal from 18 to 21 April 2016.](#)

The members of the Initiatives for the Future of Great Rivers

Ricardo Javier Álvarez, Vice-President of the Argentinian subsidiary of the Ibero-American Institute of Maritime Law (IIDM); legal coordinator of the International Catchment Area Commission of the IIDM.

Madine Ba, General Secretary of the Organisation to Develop the Senegal River (OMVS).

Julien Clément, PhD in anthropology; deputy director of Research and Education of the Musée du quai Branly.

Daniel Dagenais, Vice-President of Operations for the Montreal Port Authority.

Bernd Gundermann, founder of the Urbia Group – Think Beyond.

Mohammad Mozammel Haque, President of the Bangladesh Inland Water Transport Authority (BIWTA).

Kabine Komara, High Commissioner of the Organisation to Develop the Senegal River (OMVS).

Sergio Makrakis, Associate professor and researcher at the State University of Western Parana - Unioeste (Brazil); specialist in assessing the impacts of migrating fish passes on fish populations.

Ghislain de Marsily, Emeritus professor at the University of Paris-Sorbonne (Paris VI-Pierre-et-Marie-Curie) and at the Ecole des Mines de Paris, member of the Academy of Sciences, the Academy of Technologies, the Academy of Agriculture of France and foreign member of the US Academy of Engineering.

Md. Abdul Matin, Head engineer with the Dredging Department of the Bangladesh Inland Water Transport Authority (BIWTA).

Tamsir Ndiaye, General Manager of the Diama Management and Operations Company (SOGED).

Erik Orsenna, economist, author, member of the French Academy, and specialist in sustainable development, the environment, agriculture and emerging economies.

Marc Papinutti, General Manager of Voies Navigables de France (VNF).

Papa Abdoulaye Seck, Minister of Agriculture and Rural Facilities of Senegal.

Alfredo Sese, Technical Secretary of Transport and Infrastructure at the Rosario Board of Trade.

James Spalding Hellmers, Paraguayan General Manager of Itaipu Binacional.

Viraphonh Viravong, Vice-Minister of Energy and Mines of the Lao People's Democratic Republic.