



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

**Guyana**  
France



The health of rivers,  
human health

The example of  
the River Maroni

8<sup>th</sup>

SESSION

APPEALS AND RECOMMENDATIONS

15/19 april 2019

Bringing together actors committed to the development and protection of the world's rivers, Initiatives for the Future of Great Rivers (IFGR) offers an original, international and multidisciplinary forum open to stakeholders and oriented towards action. It acts to conceive the river of tomorrow and contributes to enriching national and international debates on water and climate change. Indeed, rivers are situated at the heart of current climatic and environmental issues (energy, production, food security, public health, mobility, etc.) and could also provide solutions for building a sustainable world.

Founded by CNR, the multipurpose concessionary of the River Rhone and France's leading producer of 100% renewable electricity, IFGR is an association in the general interest chaired by Erik Orsenna, an economist and writer, member of the prestigious Académie Française.



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# Introduction

The permanent interaction between freshwater and saltwater, habitats and human beings makes water pollution a major issue with multiple consequences. It can be summarised by a single sentence: human health depends on the health of rivers. In October 2017, Initiatives for the Future of Great Rivers (IFGR) already focused on this issue, on the analytical methods and tools needed to understand and evaluate the phenomenon of pollution, and the levers of action experimented on rivers to combat it.

IFGR continued this work by devoting its 8th international session to the issue of health, using the example of the Maroni basin. At the invitation of the Pasteur Institute of Guyana, and in partnership with the Prefecture of the region, the Territorial Authority of Guyana and the ARS (the Regional Health Authority), our experts met with the local stakeholders to talk about three major themes: **the prevention of infectious and waterborne diseases; access to drinking water and drainage; the activities of clandestine gold prospection and health.**



A vector of the history of this overseas territory, the River Maroni indeed brings many issues regarding water to the forefront – its utilisation, its quality, its representations, its management – with undoubtedly more intensity than elsewhere. It lies at the heart of the future of this region in the throes of demographic, economic and ecological transition. The situation of the Maroni basin has reached a critical point at which the current situation can no longer continue, leading to the emergence of new challenges.

“ *The objective is for the territory to break out of its isolation, so that Guyana is able to control its destiny. The River Maroni is a vector of multiple missions and vocations that have to be understood and managed.* ”

ÉMILIE VENTURA,  
TERRITORIAL COUNCILLOR, TERRITORIAL AUTHORITY OF GUYANA

At the end of these days of exchanges, IFGR’s members were convinced that the Maroni can provide us with lessons of wisdom for use elsewhere, though better insight into the interaction between human beings and water. Our second conviction concerns the interest of our interdisciplinary and ecosystemic approach, which avoids focusing on some cogent markers. By approaching the river through the prism of health, IFGR shed new light at the intersection of politics, economics, social science and the environment.

If our rivers are threatened, then it is our very identity that is undermined, and our lives placed in jeopardy.

**One River, one Health to protect and cure the natural environments and human beings efficiently.**

“ Our difficulties are enormous, but we will manage to deal with them through our combined efforts. We mustn’t be afraid to look at the future in order to better manage the stakes in play for our fellow citizens. We owe them this just as we owe the entire world. More than ever the world is looking at us since the role played by Amazonia is vital in the face of climate change. Thank you for drawing the attention of the world to us. Let each of us try to be worthy of our destiny for the good of all in Guyana. You can count on my commitment alongside you. ”

PATRICK LECANTE, PRESIDENT OF THE WATER AND BIODIVERSITY COMMITTEE OF GUYANA,  
MAYOR OF MONTINÉRY-TONNÉGRANDE

# More than a border, a living area with a strong culture

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A living area with a strong cultural community shared by Suriname and Guyana, the Maroni is everything except an administrative frontier.

The populations of both sides of the river or from the inland to the coasts cross it and mingle. It provides the foundations of identity for the communities living on its banks and it is a source of wealth (fishing, gold, etc.). The Maroni obliges us to change our perception of our relationship with nature and the other.



# 1.1.

## Land and forests born of water: the incredible natural wealth of Guyana

The world's  
**3<sup>rd</sup>**  
largest  
fresh water  
reserve

With its surface area of 83,856 km<sup>2</sup>, Guyana is the largest French overseas department and the only one in South America. Situated between Brazil and Suriname, it benefits from an exceptional geographic position, natural resources and mineral deposits. More than 95% of its surface area is covered by equatorial forest, and it is ranked by UNESCO as having the **world's 3<sup>rd</sup> largest reserve of available freshwater**, with its two main rivers and many smaller ones.

**610 km**  
long: the Maroni  
is the Guyana's  
longest river

Structural elements in the territory's geography, the rivers Oyapock and Maroni provide natural borders, the first with Brazil and the second with Suriname. Water also forges the identity of the communities that have peopled their banks over the centuries.

**65,000**  
**km<sup>2</sup>**  
of watershed



## AN UNPREDICTABLE RIVER

Although the average discharge of the Maroni is around 1,700 m<sup>3</sup>/s, it is very variable according to sections and above all to seasons, since variations of rainfall are considerable in this tropical region. The discharge can change from 181 m<sup>3</sup>/s during the low flow period in the months of October-November to 100-year floods of 7,000 m<sup>3</sup>/s, i.e. a discharge multiplied by 40!

Risks exist in both cases: during dry seasons, influxes of saltwater can affect drinking water supplies, while during the rainy season, floods can imperil the surrounding populations and their crops (slash and burn\*).

The rapids are another difficulty for more than 500 pirogues passing daily from one bank to the other, and for the other ones which transport goods and fuel (10,000 tonnes of goods and 30,000 m<sup>3</sup> of fuel transported every year on the Maroni). During the dry seasons, the rapids appear unsurmountable whereas they become invisible during the rainy season.



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\*Slash and burn is the term used for a very common traditional agricultural practice in Guyana. It comprises clearing small areas of forest, sowing the land cleared (mostly with tuber plants – manioc and yam – and banana), then leaving it fallow and moving on to another cultivated plot. The ancestral system of the Amerindians, the practice of slash and burn was then adopted by the communities that settled in French Guyana in the inland communes and around the rivers.

# 1.2.

## A land of water, a land of people: an identity built around the river

**6**  
Amerindian  
peoples  
in Guyana  
i.e. more than  
**10,000**  
people

**25**  
ethnic  
groups

The River Maroni is **an Amerindian river whose banks have been inhabited for thousands of years, with very mixed populations.** **Damien Davy**, anthropologist and Director of the Human-Oyapock Habitat Observatory within the CNRS, spoke about its history during the session.

At the beginning of the 16<sup>th</sup> century, there were many Amerindian villages along the lower and middle Maroni. Two centuries later, the river also became a place of refuge for the “Black Browns” (or Bushinengues), who had fled the plantations of the Surinam coast during the war between the Dutch, Djukas and Alukus (1791-1793).

In the 19<sup>th</sup> century, the gold rush and the construction of the penal colony at Saint-Laurent-du-Maroni led to new migrations along the whole length of the river. The Kali’nas, who peopled the Lower Maroni, were displaced while numerous emigrants and outcasts from France arrived. In 1887, when the gold deposits were discovered on the Lawa and Tapanahoni, creoles came to settle on the Upper Maroni in search of gold.



*The early Amerindians ©Jean Hurault*

The civil war in Suriname between 1986 and 1992 made a deep impact on the demography and organisation of the territory, with migrations that accelerated and moved towards Grand-Santi and Saint-Laurent-du-Maroni on the French side.

About 15,000 people migrated and the population of Saint-Laurent-du-Maroni quadrupled.

The town’s demographic growth has since been fuelled by other influxes of migrants,

in particular from Haiti and Brazil. From period to period, the river has therefore undergone myriad movements of populations, giving rise **to a diverse population composed of 25 different ethnic groups, each with their own language.**



The populations have made the Maroni their own for their daily lives (they wash in and travel on it), to the point where it has become a key element of their identities. In the communes of west Guyana, **the people say they are of the river, without any notion of land or birth-right**. The families live in both sides of the river and mostly come to Guyana in search of medical care, and the social and education system, without condition of nationality. What is more, the demarcation of the river as the border established in 1935 by France and Holland remains blurred and is still contested by Suriname, impeding the combat against illegal activities.

**The notion of border here means something quite different.**

“ *There is no border for wealth, nor is there any border for poverty, diseases, for the human misery represented by illegal gold prospection and forced prostitution. Nor is there any border when our rivers are polluted by cupidity and trafficking. No border when we have to save a wounded person on the other bank, because we are above all human beings. (...) In reality, the border is not an enclosure, it is an opening to the world, the other, and to difference. In no way should our borders be closed doors. Obviously, we have to protect ourselves. But we must also know each other better on both sides of the river. That's the difficulty of maintaining balance on the Maroni that has to be solved.* ”

PATRICK LECANTE, PRESIDENT OF THE WATER AND BIODIVERSITY COMMITTEE OF GUYANA,  
MAYOR OF MONTINÉRY-TONNÉGRANDE

**The relationship with water is different too**, with cultural and ancestral community practices that come into conflict with the regulatory health standards imposed by France and Europe. Pedagogy is essential to reconcile these visions of the utilisation of water and its conservation.

“ *It is increasingly necessary for us to work with the populations to understand their approach to water and invite them to conform to certain regulatory principles that cannot wholly correspond to it.* ”

FABIEN LALEU, DEPUTY DIRECTOR OF THE ARS OF GUYANA

# 1.3.

## A vulnerable river at the heart of turmoil in Guyana

The River Maroni is subject to various types of pressure:

### • DEMOGRAPHIC AND MIGRATORY

With the combined effect of waves of migrants and a high birth-rate, the population of Guyana should reach 316,000 from now to 2030 (versus 274,150 today). And the more one penetrates inside the territory, towards the communes of Apatou, Grand-Santi and Maripasoula, the higher the rate of demographic growth, reaching between 4 and 6% (i.e. a twofold increase in the population in 18 years), and the lower the rate of medical coverage. Perinatal care has become a major health challenge (+ 2,000 births forecast by 2030, i.e. 8,000 a year) with very high rates of premature births and infant mortality and a high rate of pregnancy among minors (up to 12%).

In order to reduce inequalities and bring the populations closer to available health care, **preventive healthcare centres (CDPS) have been deployed along the Maroni over the last 20 years** and there are now 18 of them. They care for a population of more than 35,000 inhabitants, in addition to the Hospital Centre of West Guyana at Saint-Laurent-du-Maroni, and received more than 16,500 patients in 2018.

Nevertheless, the supply of this healthcare is disturbed by the high turnover of doctors who are faced by very difficult living conditions. It must also be strengthened to avoid transferring people to the hospitals of Cayenne and Saint-Laurent-du-Maroni, especially future mothers sometimes obliged to leave their homes for more than one month. This raises the question of the balance that must be found between the health risk incurred by remaining in one's village and the cultural risk of breaking the bonds with one's community by going to hospital.

### HEALTHCARE CANOES ON THE MARONI

The project for three “healthcare canoes” driven by the ARS over the next 2 to 3 years, is intended to strengthen public health actions on the River Maroni. They will allow health professionals to travel on the Lower Maroni up to Maripasoula, on the Upper Maroni from Maripasoula to Antekumpata, and on the Oyapock for actions to prevent and promote health adapted to the peoples of each of the areas. The multi-ethnic composition of the population indeed requires adaptations regarding both treatments and prevention. The additional project of associating cultural mediators with the healthcare professionals in the CDSP is also in line with this objective.

• URBAN

This demographic boom leads to the spontaneous construction of shacks, most usually not connected to the drinking water network and without wastewater treatment (*cf part II.2*). They make up more than half the dwellings of the town of Saint-Laurent du Maroni and spring up due to the lack of housing, housing poorly adapted to the administrative and economic situation of the people, or to the lifestyles of these communities oriented towards the exterior.

• ECONOMIC

Since it hasn't been developed (to pass the rapids or to install wharves), the river remains dangerous and canoe accidents are very frequent in the creeks and on the river. Drowning is the leading cause of death among under 15-year olds.

Despite all this, the Maroni is the sole route of communication in west Guyana. It is the vector of all types of trafficking, legal and illegal. It currently serves no new economic sector of activity other than mining, timber and can't support the economic development of the most remote territories\*.

More than  
**50%**  
of the  
buildings were  
shacks built  
spontaneously  
without permits  
in Saint-Laurent-  
du-Maroni

From **13**  
to **20%**  
of the  
population live  
without water or  
electricity



\*A third of the population lives below the poverty threshold (set at €420 a month in Guyana) and the GDP per capita is half that of metropolitan France. Guyana imports 10 times more than it exports, and 80% of the fuel it uses for energy is imported. Together, the sectors of public administration and space make up 50% of Guyana's GDP.

**22%**  
of the Guyanese  
population are  
unemployed

of whom  
**46%**  
are under  
25 years old

These conflicting pressures and the effects they have on the health of the river and the populations led us to ask questions that are both essential and universal:

- **The situation resulting from modernity and disillusion** with it in a region marked by “the double addiction” of illegal traffic and subsidies. The young are particularly hard hit. This inactivity occurs hand in hand with a loss of references between traditional values and modernity.

The Amerindian populations are also affected by this collision with modernity. An example regarding the habitat was given by **Marion Comptour**, the CNRS Coordinator of the OYAMAR programme dedicated to mobility on the River Maroni. By sedentarising these traditionally mobile populations, and by modifying their huts on stilts and getting them to live in concrete and sheet steel buildings under the pretext that their homes were unhealthy, by eliminating the possibility of slash and burn farming, we have denatured their relation with the river and the land. We have degraded their adaptability to natural conditions.

“ *There’s a problem of conflicting loyalties, between generations on the one hand: how children who are educated by the French Republic turn against their parents who haven’t had this education, and conversely; and between types of knowhow on the other hand: between a custom that has become archaic and the imposition of a model of modernity, that is not necessarily adapted and which creates uncertainty. This relationship of conflicting loyalties occurs alongside the construction of the State, with the quest for identity, and it structures how, collectively, we build the way we live together locally.* ”

PASCAL BOURDEAUX, SOCIOLOGIST OF RELIGIONS, ÉCOLE DES HAUTES ÉTUDES, MEMBER OF IFGR

- **The question of identity** in a territory rich with 25 ethnic groups and which functions with numerous imported mindsets. **Sylvio Van Der Pjil**, President of the Grand Customary Council of the Amerindian and Bushinenge populations, and **Gabriel Carles**, Head of the Gynaecology Department of the West Guyana Hospital Centre, both expressed their concern regarding this question of youth. A shared cultural identity, driven by a vision of the future remains to be built. It alone will slow down the phenomena now in progress such as suicides and collective hysteria, increasingly apparent among the Amerindians of the Upper Maroni, where the rate of evangelisation has risen to 50% and is now competing with traditional religions.

“ Although multiethnicity can be a form of wealth, we’re entitled to feel concerned about the future: mass unemployment, drug trafficking, the deculturation of different communities, intercommunity conflicts, and so on. The department is riven by strong antagonisms: gradual mixing on the one hand, which leads to building a tolerant society; and a withdrawal into distinct communities on the other hand, possibly leading to the territory’s fragmentation. Guyana’s border rivers lie at the heart of the problem: they can both link and separate communities. ”

GABRIEL CARLES, DOCTOR, HEAD OF THE GYNAECOLOGY DEPARTMENT,  
WEST GUYANA HOSPITAL CENTRE (SAINT-LAURENT-DU-MARONI)

- **That which leads to the decline of multilateralism:** whether for the Oyapock or for the Maroni, there is no international agreement between the bordering countries or joint governance bodies for managing the rivers.
- **The measures that must be taken to combat the anthropic pollution** that affects human health and **the crime** related to the strong growth of uncontrolled gold prospection.







# A river bearing life and death

# 2

The populations of the River Maroni are exposed. A source of life, the Maroni can also poison them, making better protection and management necessary.

The peoples of the Maroni are exposed to numerous difficulties: geographic isolation, a low socioeconomic level, exposure to exceptional environmental conditions, their lifestyle and, above all, important health risks.

# 2.1.

## The scourge of infectious diseases

Arboviruses represent more than **40%** of infectious and emerging diseases in the world

A wide range of infectious and tropical diseases are present in Guyana. Some of these diseases exist in endemic and/or epidemic form, such as respiratory diseases (flu, tuberculosis, etc.), vector-borne diseases (arboviruses, malaria, etc.), diseases transmitted by handling (digestive parasites, etc.), and sexual diseases (HIV and others).

Equatorial climatic conditions and the lifestyles of the populations in particular lead to the considerable **development of diseases transmitted by mosquitoes in the Maroni basin**. The people use the surface waters of rivers and creeks to wash themselves, and wash their dishes and clothes. Some parts of the river containing stagnant urban water favour the proliferation of insects and parasites.

Currently, worldwide, arboviruses (diseases transmitted by mosquitoes and ticks) represent more than 40% of infectious and emerging diseases. They include dengue fever which has the highest prevalence in the world, with 390 million persons infected a year, chikungunya, zika virus, yellow fever, etc.

To combat the risks linked to these arboviruses, Guyana must combine several approaches:

- **Improving knowledge of arbovirus transmission processes:** epidemiological monitoring is not enough, emphasised **Claude Flamand**, an epidemiologist at the Pasteur Institute of Guyana. Although it permits the early detection of epidemics and observing their evolution, it does not inform on their real impact. Seroprevalence studies carried out directly on the population are therefore important for determining the percentage of people actually affected.
- Through **prevention**: coverage by vaccines is vital, although once again it varies substantially according to the population. It must also be linked to the analysis of cultural practices and knowledge of the populations to limit the proliferation of arboviruses by eliminating larval habitats.

The risk of infection is considerable and new threats are emerging, linked to exposure to exchanges with the coast and Suriname via the river (metabolic diseases due to new food habits, addiction to alcohol and pure hard drugs), and water contamination.

## **THE PASTEUR INSTITUTE OF GUYANA AT THE CENTRE OF INTERACTIONS BETWEEN WATER AND HEALTH**

The Pasteur Institute has been present in Guyana since 1940 and plays an important role in the identification, prevention and treatment of infectious diseases. It carries out epidemiological surveys in the field to understand the circulation of infectious and vector-borne diseases, notably in regions located close to rivers. It also carries out analyses of river and well water, in collaboration with the Regional Health Authority (ARS) for the cities.

With its “Vectopôle Amazonien”, a level 3 biosecurity laboratory dedicated to medical entomology, the Pasteur Institute of Guyana has been equipped since 2014 with a leading-edge technological tool for its research missions focused on insect vectors, in support of public health and training.



# 2.2.

## Water-borne diseases: the triptych of water, sanitation and hygiene

**42%**  
of the population  
of Grand-Santi  
and **52%**  
of the population  
of Apatou do not  
have access to a  
source of water  
**nearer than  
1,000 metres  
from their  
homes**

Typhoid, cholera, dysentery and acute gastroenteritis: water is the vector of numerous parasites, bacteria and viruses. The population is directly exposed to pathogens contained in water through drinking, and indirectly through food contamination.

The combination of three factors:

- **The lack of access to drinking water:** more than 45,000 people lack direct access to drinking water. To mitigate this shortcoming, temporary supply systems have been installed in remote sites:
  - **The recovery of rainwater**, for family use in sites far from the public network and with sparse populations.
  - **The installation of manual pumps** (hand pumps) to tap groundwater. Although this system is sturdy and inexpensive, it is subject to many problems including the absence of regular maintenance, the non-repair of faulty parts and bacterial contamination.
  - **The installation of stand posts**, supplied by the public network in unplanned settlements.



### HEALTH CONTROLS TO KNOW THE QUALITY OF THE WATER DISTRIBUTED

In Guyana, health control is placed under the responsibility of the ARS and is carried out in collaboration with the Pasteur Institute of Guyana regarding the analyses. In 2018, more than 80 samples were taken from water treatment stations in the Maroni sector. The populations with access to drinking water are supplied with water of good bacteriological quality.

Turbidity is another criterion of quality. A high level of turbidity means the probable presence of pathogenic elements in the water and it can impede disinfection and treatment systems. The communes of Apatou and Maripasoula are affected by this phenomenon. Lastly, regarding the results on aluminium – another indicator of the efficiency of water treatment systems – only 18% of the Guyanese population supplied with water benefit from water of good quality. Aluminium contents are higher than the regulatory threshold for 44% of the population.



- **Shortcomings in wastewater treatment:** the rate of connection to the sanitation system in the Intercommunal Authority of West Guyana\* remains very low, except in Saint-Laurent-du Maroni (65% of the population) and Mana (from 25 to 30% of the population). Furthermore, all the installations are characterised by a lack of general maintenance, in particular linked to the low number of subscribers. The non-public drainage systems in Maripasaoula and Grand-Santi do not conform to standards; discharges of household waste into the water have also become a major source of pollution in the river.

- **The lack of hygiene:** the populations often know very little about the cycle of oral-faecal contamination and the rules of prevention. The customs of the Amerindian communities are still strong and exacerbate contamination: the use of surface waters for every domestic need, defecation in rivers, etc.

As emphasised by **Christine Belanger** (Intercommunal Authority of West Guyana), the issues of drinking water supply and sanitation are not only technical. Facilities have been installed and techniques deployed in certain areas, but the population doesn't use them. So, there is a real need to provide solid education on hygiene to reduce health risks.

Access to drinking water has been a **human right since 2010**

**More than 2 million people die** every year in the world due to insalubrious water and poor hygiene and drainage



Information sheets published by the Intercommunal Authority of West Guyana



\*The Intercommunal Authority of West Guyana (CCOG) groups eight communes – including seven alongside the Maroni – and a population of 93,674, i.e. 34.4% of the Guyanese population. Sanitation is mainly carried out by lagooning in this region.

## 2.3.

### The many impacts of illegal gold prospection

The history of gold in Guyana is not new: the first gold rush occurred as early as 1855, with the arrival of 26,000 gold prospectors, and lasted until 1930. The second occurred in the 1990s, making illegal gold prospection a genuine scourge in the large gold bearing basin of Surinam and Guyana. The River Maroni, which crosses it, has always served as a logistics route for removing the gold and transporting prospection equipment.

Today, there are **300 illegal gold prospection sites, often located in the deepest forest, with a total production of 10 tonnes of gold versus 3 to 4 tonnes a year for regulated production**. The population of gold prospectors is estimated at 10,000, mostly from Maranhão, the poorest State in Brazil.

#### MERCURY IN THE RIVER

This activity generates considerable pollution, due to the systematic, inconsiderate and uncontrolled utilisation of mercury; this is in addition to the erosion of the river banks which releases the heavy metals naturally contained in the soil. The use of mercury and deforestation make illegal gold prospection lethal for nature.

A joint study carried out in 2007 by the CNRS and the BRGM on the turbidity of the water and the mercury content of fish showed the clear correlation between the gold prospection sites and the concentration of mercury. From upstream to downstream, the sediments become increasingly loaded with mercury, amplified by discharges of mercury in the small creeks of the river. The mud and increased turbidity lead to the rarefaction of fish resources and their contamination by mercury.

According to the Guyana Water Agency, **140 bodies of surface water out of the 840 monitored are degraded by illegal gold prospection** and the trend is accelerating with the degradation of aquatic life and water quality due to the effect of these anthropic activities that are difficult to control owing to their clandestine nature. According to another study carried out by the ONF and the WWF, covering three countries: Guyana, Suriname and French Guyana, the impact on their rivers is considerable. The direct impact is observed over a length of 1,840 km and the indirect impact over a length of more than 6,000 km.

## FROM NATURAL MERCURY TO THAT OF GOLD PROSPECTING

As pointed out by **Laure Verneyre** and **Valérie Laperche** of the BRGM, mercury is present naturally in Guyana. It has been established that there is ten times more mercury in the soils of the Amazonian plateau than in the soils of temperate regions. 95% of the mercury is natural. The extraction of gold, practiced for more than a century (alluvial gold in riverbeds), contributes to the risk of mercury through soil erosion and the return to suspension of the mercury deposited in the soil and water, leading to its transformation into methylmercury which is assimilated in the food chain. Gold prospecting is above all a direct source of mercury pollution in water, due to the use of this chemical element to amalgamate gold. Despite the fact that mercury has been forbidden since 2006, illegal prospecting sites still continue to use it. 1.3 gram of mercury is needed to extract 1 gram of gold, meaning the total quantity of mercury released into the environment is about 286 tonnes.

Furthermore, movements of populations and the slash and burn method used for farming also participate in the artificial erosion of soils and the release of mercury into water.



*Illegal gold prospecting site*



## OTHER HARMFUL EXTERNALITIES THAT MUST BE FOUGHT GLOBALLY

Besides pollution, illegal gold prospection leads to other negative impacts that **Frédéric Bouteille**, Sub-Prefect of the inland communes, presented to us:

- **An underground economy** toxic to local economic development and traditional lifestyles. The economy of the commune of Maripasoula, which has been built on illegal gold prospection and is totally dependent on it, runs at two speeds since the wages of the prospectors far outweigh those practised in the official economy.
- **The development of petty offences and criminality**, linked to the corrupting power of gold prospection on the riverine populations.
- **The worsening health of the surrounding populations** (87% of the pregnant women of the Upper Maroni present a risk of foetal contamination by mercury according to an epidemiological study performed between 2002 and 2017) as well as that of the gold prospectors who have to face the physical difficulty of their work, the lack of hygiene and diseases (malaria, diarrhoea, sexually transmissible diseases, beriberi linked to a shortage of vitamin B1, etc.).

The organisation set up by the French government to combat illegal prospection was initially wholly repressive at the beginning of the 2000s, but in 2007 it was extended by other actions in order to treat all these externalities together. Since 2019 it combines the resources of the Amazonian Park of Guyana, the ONF and the DEAL alongside those of the government.

It comprises:

- **A repressive section driven by the administrative and judicial police**, known as operation HARPIE. It is endowed with considerable human and financial resources (140 full-time gendarmes) and permits containing the phenomenon though without eliminating it. Indeed, the task is huge, with respect to both the size of the territory to be controlled and the conditions of implementation: the gendarmes are faced by highly mobile populations that adapt quickly in the deepest forest, making it impossible to apply French legal procedures to arrests. They are also faced with numerous and varied sites (from 6 to several people per site) and a clandestine population that cannot speak the language. Thus, the objective is to confiscate the equipment found in the forest and on the river. In 2018, €31 M in criminal assets were confiscated while over 3,000 camps have been destroyed over the last 10 years.
- **A diplomatic section** with Suriname to block the “river highways” and ensure the traceability of the gold,
- **An economic section**, to permit local alternative economic development,
- **A social section**, by associating the populations.

“ In order for you to understand the combat against illegal gold prospection, imagine a football stadium measuring 100 metres by 50 metres, plant it with the vegetation of the Amazonian forest and imagine what the goalkeeper sees from their position. He doesn’t know what’s happening in the width and he gets lost in the length. We need 15 million of these goalkeepers, one for each stadium. So, you now realise what this combat entails. ”

GENERAL PATRICK VALENTINI,  
COMMANDER OF THE NATIONAL GENDARMERIE OF GUYANA

**10,000**  
illegal gold  
prospectors  
estimated in  
Guyana versus  
500 on legal  
prospection sites

**300**  
illegal gold  
prospection  
sites

**€350**  
million  
generated  
(estimation)





# Building a project for the river

# 3

An example of the complexity of  
todays' world with opportunities  
and drawbacks, Guyana can be a  
laboratory for another new and  
ambitious model of development  
around the river.

# 3.1.

## Rebuild the link with the river and give it a future

The picture of the Maroni is one of wealth and weaknesses, inviting the viewer to go beyond a binary vision that would compare modern with traditional medicine, standards with perceptions, the legal with clandestine, closure and openness, repression and dialogue. Indeed, Guyana represents a huge vista of possibilities.

When presenting our works at the Prefecture of Cayenne, Erik Orsenna defended the conviction shared by our members that **project is necessary for this river, which is currently protected, weakened and fragmented.**

Restoring contact with it is a prerequisite. In this respect, Hamburg, Seattle and Vancouver provide examples of cities that have succeeded in weaving a skein of confidence and ambition with their rivers and waterfronts. It is therefore up to the local politicians to imagine this project, useful for several reasons:

- **Accompany demographic growth,**
- **Help to combat new beliefs** in weakened communities,
- **Give perspectives to the young:** besides good health, they must be able to lead satisfactory lives.
- **Eliminate the subsidies** which cannot last forever,
- **Quite simply change a situation** that can no longer remain as it is, while climate change will increase the risks and misery.

“ *What’s the point of increasing life expectancy if it’s to offer a life without hope?* ”

ERIK ORSENNA  
CHAIRMAN OF IFGR

## 3.2.

### The conditions for carrying out such a project

According to us, two major types of condition are required.

#### **GEOGRAPHIC'S CONDITION**

River project means a watershed project that requires **cooperation from both banks**, for the well-being of the populations. In this respect, the River Senegal is exemplary since its governance gathers the countries it crosses and its different structures are owned in common. Setting up the OMVS was a solution for survival, imposed by the scarcity of the resource following the severe droughts of the 1970s. On the contrary, French Guyana is in a situation of abundance (sun, water, wood, fish resources) but which requires management.

**Cooperation is also needed from upstream to downstream**, as in the case of France and Switzerland for the Rhone, where it obeys a rationale of unity and solidarity in order to manage the accumulation of pollution, develop safe navigation, provide access to prevention and care for all, etc.

The river is a living being, it cannot be divided. Also, cooperation is necessary in different areas: scientific and technical to allow the prospectors to definitively give up mercury; in the areas of health and social conditions so as not to give the monopoly of information on gold prospection to the traffickers.

“ *The River Maroni is wounded by gold prospection but it is not yet sick, and remains in its natural conditions. On the contrary, the populations living on its banks accumulate various exposures that weaken them in a context of societal change and demographic transition. In order to aid the river to defend itself and preserve the heritage it represents, it is necessary to act and anticipate upheavals in the environmental and sociocultural balances caused by urbanisation, mining, farming, fishing and the development of the river.* ”

PAUL BROUSSE, COORDINATING DOCTOR OF THE DECENTRALISED HEALTHCARE CENTRES  
(CAYENNE HOSPITAL)

## THE BIO-PLATEAUX PROJECT FOR WATER MANAGEMENT ON THE SCALE OF THE BASIN

Driven by the International Office for Water and the Water Office of Guyana, the BIO-PLATEAUX project, which will be launched at the end of 2019, is intended to develop sharing information on water and the biodiversity of aquatic habitats between Guyana and its neighbours of Brazil and Suriname, notably regarding the watersheds of the Oyapock and the Maroni.

This cross-border cooperation will for the first time allow the exchange of data, the sharing of tools with the support of the CNES, and contribute to education on the environment.

## GOVERNANCE'S CONDITION

It is necessary **to adapt the rules** of the French Republic or Europe to this specific territory **and associate the people**. The gap between supranational standards and reality in the field is too large, between the doctrine and the perceptions of the population regarding water consumption and conservation. This adaptation must occur along with the reunification of government actions: drinking water cannot be dissociated from drainage and hygiene.

Lastly, **dual decentralisation** must be implemented to manage the challenges specific to Guyana and its rivers: the aim is to increase this territory's autonomy in relation to metropolitan France and the regions in relation to Cayenne.





## 3.2.

### The urgency is there but the possibilities are many

The urgency is there but Guyana has the great chance of having many possibilities, with an approach of experimentation and partnership already well established between associations and research organisations, the health authority and institutions.

Exploration and experimentation must be the keywords for what follows, whatever the domain:

#### ANOTHER HEALTH IS POSSIBLE

It consists in **adapting dogma and protocols to the aspirations and habits of the populations**. This what the ARS did in 2018 to cope with suicides in the indigenous populations, with projects that went outside the strict domain of healthcare and were intended to provide well-being. The project to integrate traditional healers in the health protocols of western medicine is another example, which will allow better assistance and care for certain illnesses, without jeopardising the principles of hygiene and safety.

**This other approach to health is also pragmatic and innovative**, as was shown to us with the experimental MALAKIT project led by **Maylis Douine** of the Antilles-Guyana Centre of Clinical Investigation (Cayenne Hospital Centre). Developed with several partners from three countries (Suriname, Guyana, Brazil), it permits the self-diagnosis and treatment of malaria among gold prospecting communities. It first responds to a need: that of clandestine gold prospectors who remain out of range of the health monitoring system but who are nonetheless exposed to malaria virus. It also responds to several constraints: the immensity of the territory, the multitude of gold prospection sites and the difficulty of reaching them, the mobility of these workers, and the prohibition by French regulations to set up health centres to administer treatments make it unrealistic to send medical missions to care for this population. However, the danger of clandestine prospectors propagating the epidemic is considerable, and the number of declared cases is certainly underestimated. The kit, associated with a smartphone application and the work done by mediators in the areas in which they circulate along the rivers, is proof that cooperation is possible between Guyana and its neighbouring countries.



*Illustrated  
instructions  
of the kit*

“ If the results are positive, this project could serve as an example in other regions of the world confronted with similar problems. However, beyond malaria, this small sachet represents a conceptual innovation: that of giving autonomy to people so they can perform an objective diagnosis of a disease and administer an adapted treatment to themselves, thus allowing them to take care of their own health. ”

MAYLIS DOUINE, EPIDEMIOLOGIST AND DOCTOR,  
CLINICAL INVESTIGATION DEPARTMENT OF THE CAYENNE HOSPITAL CENTRE

## ANOTHER TYPE OF MINE COULD ALSO BE DEVELOPED

This new type of mine would allow to exploit Guyana's incomparable mineral wealth (tin, lithium, cobalt, gold, etc.) while limiting the impact on the environment. Clean mines already exist in Finland and Norway. For **Ghislain de Marsily**, geologist and Member of the Academy of Sciences\* and IFGR, this will require developing strategic technologies that provide new extraction and processing capacities, that conform to environmental constraints on the one hand, and protect against irresponsible mines through taxation that would permit reducing their number and placing them in competition.

**Moving towards a traceable and responsible gold industry would be a successful wager for Guyana**, and one to which WWF France in Guyana and the BRGM contribute. The BRGM is already capable, on the basis of the mineralogical characteristics of gold, of knowing where it comes from and if mercury was used for its extraction.

Together, the two organisations implemented the TAO project aimed at installing traceability techniques for gold to combat illegal gold prospection and ensure transparency in the industry. The BRGM continues to explore these techniques to “*be able to create an identity card for Guyanese gold, that could become brand of local fabrication and provide added value to local production*”, declared **Laure Verneyre**, regional manager.

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\*Coordinator of the report “Strategy of using underground resources for French energy transition – rare metals” drawn up by the Academy of Sciences and the Academy of Technologies - 2018.



On its side, **Laurent Kelle**, the director of WWF France in Guyana, is preparing a project with the NGO Alliance for Responsible Mining (ARM), based in Colombia, which works only with artisan miners. This project will aim at phasing out the use of mercury in Guyana and Suriname, thus helping to stop its illegal transport into French Guyana. Criteria for limiting environmental impacts and traceability of artisanal production will also be proposed by ARM through this cross-border initiative.

## **ANOTHER AGRICULTURE REMAINS TO BE INVENTED**

Since the soil of Guyana is fragile and any human intervention must be carried out in a way capable of avoiding the release of mercury and its transformation into methylmercury.

To conclude, **Erik Orsenna** called on the members to determine the ambition that the IFGR wants to promote and the resources that we are ready to contribute.

“ *The people say they are of the river but which river do they mean? A memory of an old river or the ambition for a river of the future? All heritages have to be built. Exploitation without input is lethal.* ”

ERIK ORSENNA, CHAIRMAN OF IFGR





# Testimonies



“ The visit to French Guyana by the IFGR’s delegation provided a genuine occasion for the actors in the territory to stand back from daily topics such as the environment, health and social cohesion and look at them in perspective. I warmly thank IFGR for having made the audacious choice of Guyana and the River Maroni as the setting for its visit and works. The immersion of the delegation’s members in this complex territory made it possible to show the realities of life in Guyana in the light of a wide range of international experiences. In particular, beyond the historical and cultural specificities of the Maroni, the structures induced by life on the river are to a great extent comparable to those that can be seen in Senegal, Australia and Canada. The presence of indigenous peoples, and the cross-border nature of the river are indeed situations that are more widespread than previously thought, and it is most useful to compare different approaches regarding this.



The cultural and social foundations of Guyana are far removed from French standards and demand constant adaptation and innovation when considering situations. During its presentation of its works at the Prefecture, IFGR’s delegation actively participated in this consideration by setting out perspectives regarding sustainable mining, and describing examples of cross-border collaboration, based on international experiences.

I also recall the proposal of work on the religions and beliefs in Amerindian and Bushinengue country, which represents another facet of understanding the challenges of this territory, though up to now little documentary work has been done on the subject.

”

FRÉDÉRIC BOUTEILLE, SUB-PREFECT OF THE INLAND COMMUNES,  
PREFECTURE OF THE GUYANA REGION

“ This is the first time that Guyana has hosted this meeting, thanks to the association Initiatives for the Future of Great Rivers. It allowed gathering a large number of river managers and international specialists in water, biodiversity and health.

The exchanges during these five days have been very varied and rich. What's more, the experts have had the opportunity to visit the River Maroni at Saint-Laurent du Maroni where they became aware of this river's complexity and the history of the peoples that live along it, in association with health problems.

Although the objective of this session was to observe the links between the river and the health of the people that live around it, other topics such as illegal gold prospecting on global health, the runaway demographic growth of this region, and the influence of climate change on health, also have great importance for Guyana and the whole Amazonian region. I think that we should all be responsible for preserving this space so rich in culture and biodiversity, and build together a sustainable common project that takes into account human health and that of the river and all the surrounding ecosystems, since they are all closely linked.

”



MIRDAD KAZANJI, DIRECTOR OF THE PASTEUR INSTITUTE OF GUYANA

# Composition of the Rivers Committee

**Ricardo Javier Álvarez**

Vice-President of the Argentinian subsidiary of the Ibero-American Institute of Maritime Law (IIDM) and coordinator of Hidrovias Latin America.

**Pascal Bourdeaux**

Historian, Associate Professor of the École Pratique des Hautes Études (Religions of Southeast Asia).

**Corinne Castel**

Archaeologist, Director of Research at the CNRS, Director of the French-Syrian Archaeological Mission of Al- Rawda, seconded to the laboratory "Archéorient. Environnement et sociétés de l'Orient ancien" of the Maison de l'Orient et de la Méditerranée (MOM).

**Julien Clément**

Doctor of anthropology.

**Daniel Dagenais**

Vice-President of Operations of the Montreal Port Administration.

**Katherine Daniell**

PhD and researcher at the Australian National University; member of the Australian National Committee of Water Engineering; specialist on water governance and participatory processes.

**Thierry Guimbaud**

Managing Director of Voies Navigables de France (VNF).

**Bernd Gundermann**

Architect, founder of and Director of Urbia-Group – Think Beyond.

**Mirdad Kazanji**

Director of the Pasteur Institute of French Guyana.

**Kabiné Komara**

International consultant, member of the International Action Council.

**Sergio Makrakis**

Associate Professor and researcher at the State University of Western Parana - Unioeste (Brazil); specialist on the evaluation of the impacts of fish passes on populations of migrating fish.

**Ghislain de Marsily**

Emeritus Professor at Sorbonne University (Paris VI-Pierre-et-Marie-Curie) and at the École des Mines de Paris, member of the Academy of Sciences.

**Gilles Mulhauser**

Managing Director of water for the State of Geneva, Switzerland.

**Tamsir Ndiaye**

Managing Director of the Société de Gestion de l'Énergie de Manantali - SOGEM (Mali).

**Erik Orsenna**

Economist, author, member of the French Academy, and specialist on sustainable development, the environment, agriculture and emerging economies.

**Irina Ribarova**

Professor at the UACEG (University of Architecture, Civil Engineering and Geodesics, Sofia, Bulgaria), expert on the integrated management of water resources and the circular economy relating to water.

**Papa Abdoulaye Seck**

Agricultural policy and strategy specialist, former Minister of Agriculture and Rural Facilities of Senegal, member of the Senegalese Academy of Sciences.

**Hamed Diane Semega**

High Commissioner of the Senegal River Development Organisation – OMVS.

**Alfredo Sese**

Technical Secretary of Transport Infrastructure at the Rosario Stock Exchange – BCR (Argentina).

**James Spalding Hellmers**

Former Managing Director of Itaipu Binacional (Paraguay).

**Yangbo Sun**

Director of International Cooperation of the Yellow River Conservation Commission, Ministry of Water Resources, China.

**Anne-Claire Vial**

President of the Institut du Végétal – ARVALIS.

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