



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



THE MÈKONG AND THE RED RIVER







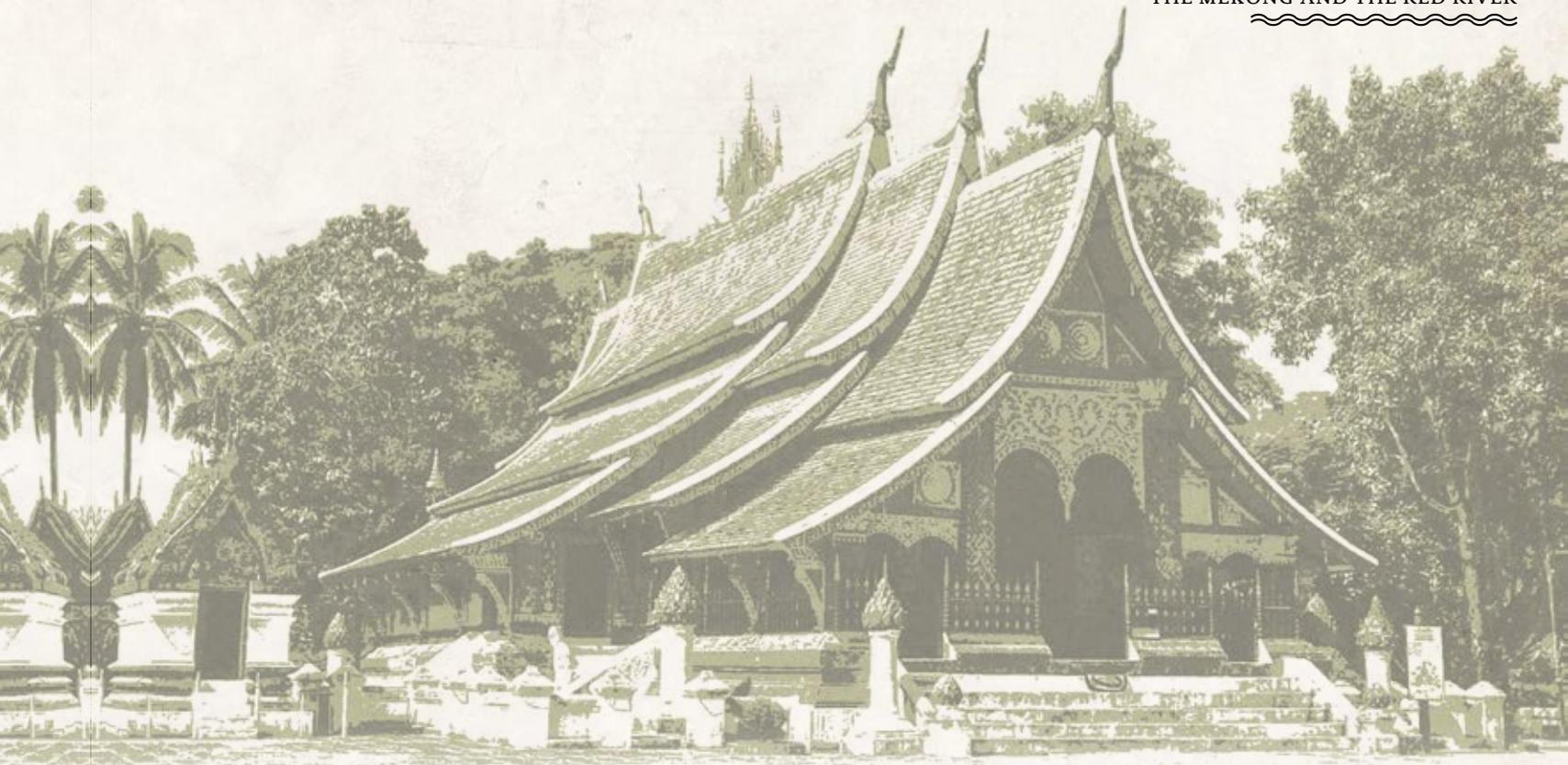
TOUR PROGRAMME

- Ho Chi Minh City
- Nha Trang
- Hanoi
- Lach Giang
- Xayaburi
- Vientiane



A circular inset image showing an aerial view of a wide river with several large, forested islands and peninsulas. The water is a light blue-grey color, and the surrounding land is covered in dense green vegetation. The entire circular image is set against a dark blue background.

MEKONG RIVER



The Buddhist temple of Vat Xieng Thong

Luang Prabang, seven a.m.

The mendicant monks have finished their tour and have returned to their monasteries with the food people were good enough to give them. The thrilled tourists have taken all their photos and returned to their guest houses for a short and restoring nap, since watching this ritual means rising early!

The vendors are setting up their stalls in the small streets to sell anything that an informed consumer could wish, including live snakes and giant cockroaches. Apparently, they are delicious once cooked. The centre of Luang Prabang is a peninsular bordered by the Mekong and the Nam Khan River. Little by little the traditional activities are being supplanted by

travel agencies and hotels. A tourist is more profitable than a connoisseur of grilled insects. Laos has a population of 6 million, which reflects their energy needs in comparison to the 65 million Thais and 90 million Vietnamese.

Laos consumes only 900 MWh. It produces 15.5 TWh and already has an installed capacity of 3,300 MW, with a potential for 20,000.

This source of exportation is therefore crucial for the country, only slightly less profitable than mining (copper and gold) and much more

so than agriculture (rice, maize, wood, etc.). So far, Laos has sold its electricity only to Thailand, though eventually it could expand its clientele to include Vietnam and all the ASEAN countries.

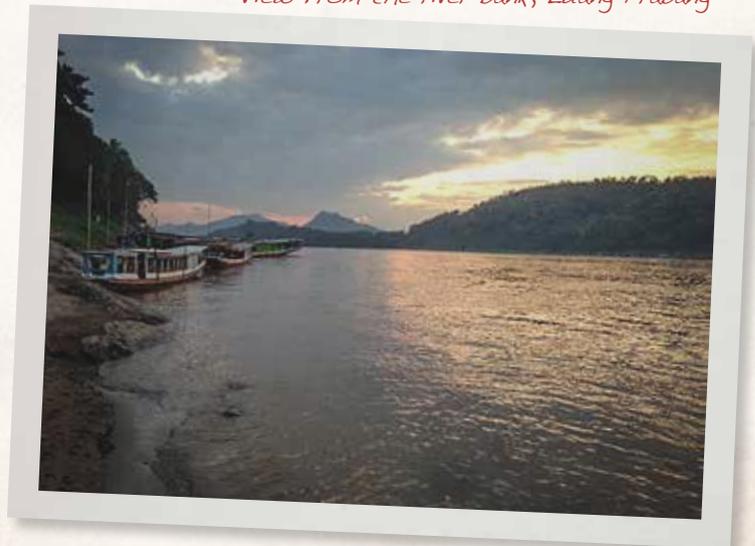
The road to Yayaburi winds through highlands planted with rubber trees on the left, and teak on the right. The government constantly asserts its desire to replant. But here, as everywhere else, how can it combat illegal exports of wood in such a huge and difficult territory?

Suddenly, the serene landscape is disrupted by construction works. I've never seen such gigantic works, affirmed by the rest of the journey.

View from the river bank, Luang Prabang



Meeting with the Laotian Deputy Prime Minister and the French Ambassador to Laos.



Soon, a new village will emerge to accommodate part of the populations displaced by the dam. The region was only sparsely inhabited. According to the official figures, fewer than five thousand people were affected which, statistically, is few compared to the two million men and women exiled by the Three Gorges Dam in China. But on the human level, the result is undoubtedly painful. Two kilometres further on a large bridge crosses the Mekong. It allows hailing a valley soon to be submerged.

When the dam is completed, the water level will rise by 30 metres and by another 5 metres at Luang Prabang.

However, Xayaburi is a run-of-the-river dam, meaning that there is no reservoir. It is supposed to affect the sites less severely. On the other hand, it depends on the flow rate that cannot be stored to produce as wished.

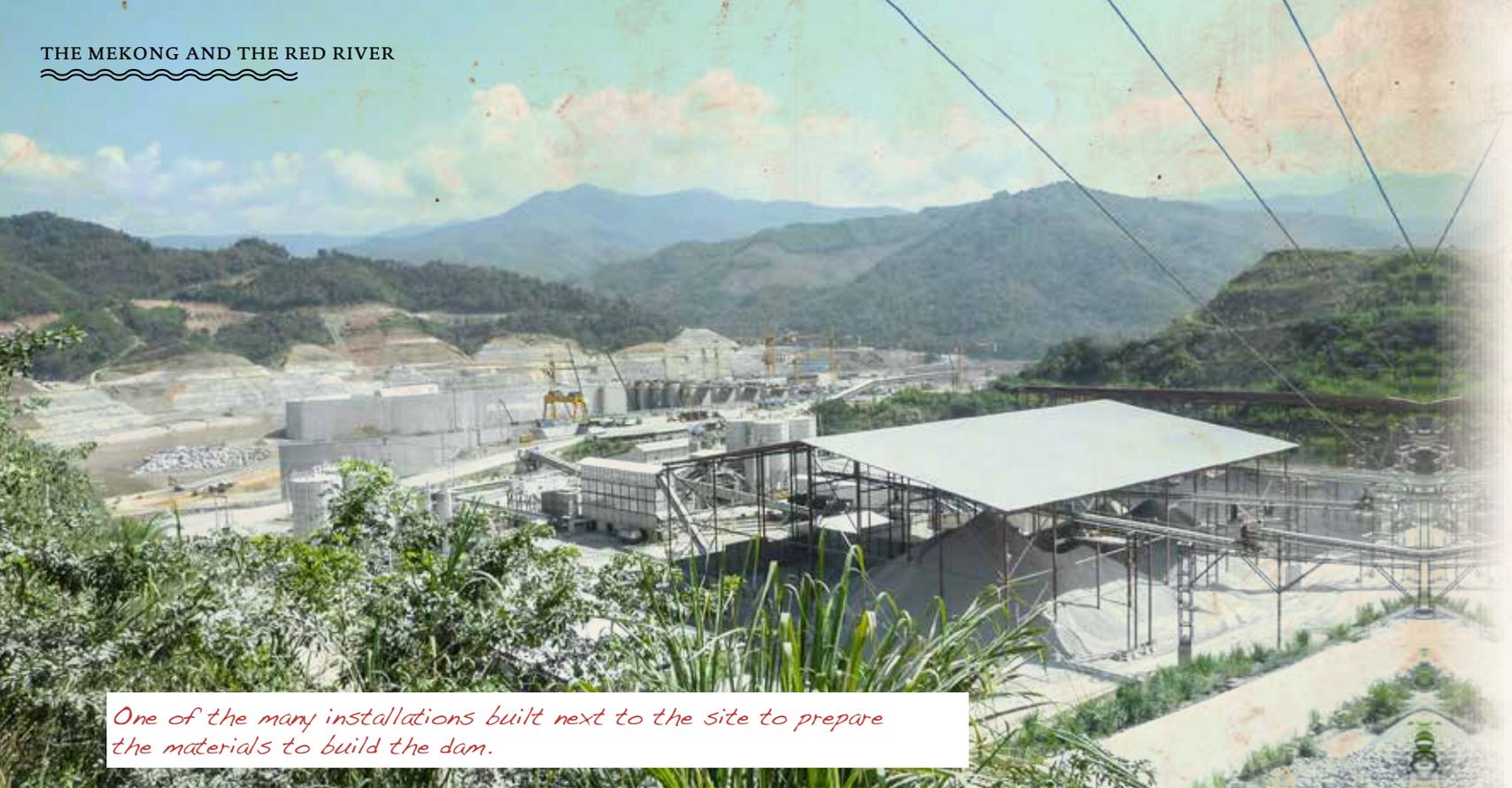
The road now follows the course of the river.

On the other bank other new villages of displaced people can be seen scattered on the hillside while on our bank factories that supply the site succeed each other, especially those that produce the four million tons of material required.

And then all of a sudden, Xayaburi appears, from the closest to the furthest structure : the lock, the spillway and, lastly, the huge hole. To dry it, it was necessary to divert the Mekong, which resisted for a long time. This is where the hydropower plant with its eight turbines will be built; seven for Thailand, and the eighth to cover the small needs of Laos. The workforce numbered 10,000 at the height of the works, and 7,000 remain today, working non-stop 24/7. The men and women work 11 hours at a stretch with a break of one hour. Despite 150 staff dedicated to safety, six people have died so far. The dam is scheduled for commissioning in 2019. Installed capacity: 1,285 MW.

Approximate and provisional estimated cost : \$4 billion.

The formidable Swiss man who supervises the visit is Jean Pierre Gisinger. After years of building dams everywhere in the world (notably 4 in Iran) on behalf of the Finnish company Pöyry, his wife left him just as he retired. He decided to re-enlist as the call of gigantic projects was too great. "I couldn't imagine waiting for the end in my farm in the Jura".



One of the many installations built next to the site to prepare the materials to build the dam.

Two questions.

According to an official document of the Ministry of Energy dating from 2012, Laos now has 26 operational dams capable of producing 15.5 TWh. The potential is estimated at 72, including 12 under construction and 25 on the drawing board. Besides the harm done to the environment, there are economic and

financial limits to these developments. Laos is surrounded by fast developing countries with constantly increasing energy needs. Can Laos continue to increase its supply?

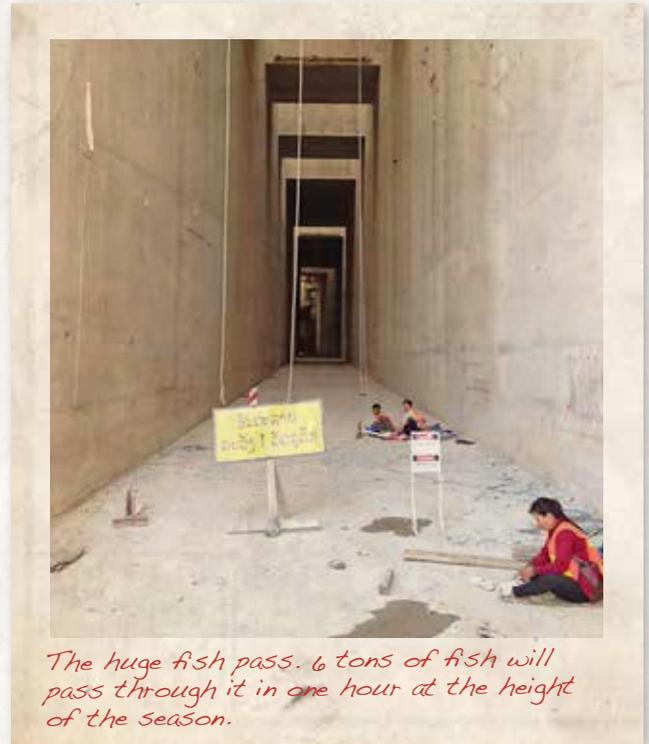
The other limit is financial. It is the clients, starting with Thailand, that provide the funds needed to build these costly facilities. If growth slackens, Thailand, with fewer requirements, will provide fewer funds.

Where does the money earned from water go? Mountains cover two thirds of Laos, which is the reverse side of having plenty of water. Also, this rough terrain makes communications difficult and condemns much of the population to isolation. Thus many of the 48 "minorities" officially identified live without hardly any contact with the rest of the country or, for that matter, modernity.

One shouldn't imagine that the population is represented only by the men and women encountered in the cities and along the rivers. Whole communities subsist under conditions that have barely changed since ancient times. They suffer from different ills, including malnutrition which affects more than one in two children (44%). However, the land is fertile and there is no lack of sun or water. Also, certain traditions are fatal.

Through the desire for "purification", some tribes force pregnant women to eat only white rice, meaning that the dietary deficiencies of the mother will impede their child's development.

There are few countries in which the divide is



The huge fish pass. 6 tons of fish will pass through it in one hour at the height of the season.

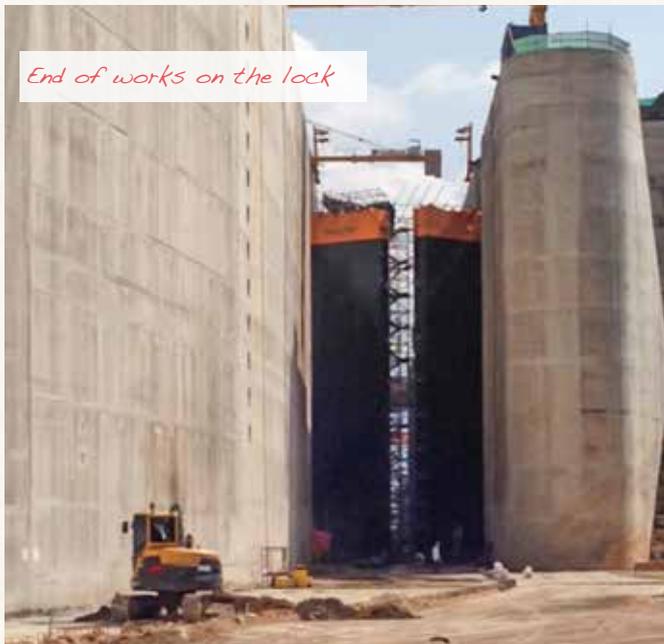
as vertiginous between the urban centres and the mountains, remote in both time and space. Hence the concern no one can ignore: does the money generated by hydroelectricity benefit the whole country?

In fact, it would be more relevant to use the future tense: who will PROFIT from the dams? These facilities are very expensive and the lenders must be repaid before the proceeds are distributed.

THE DISADVANTAGE OF BEING DOWNSTREAM

1) LAOS

The Chinese occasionally flush their dams without warning their neighbours downstream, resulting in unexpected surges. These are not too annoying when the reservoirs of the Laotian dams are not over full, but potentially dangerous when large volumes of water accumulate during the rainy season.



II) VIETNAM

Vietnam is even further downstream than Laos. It criticises all the dams in Laos for holding back the river's sediments. Bereft of this inflow of sediment, the delta cannot resist the rising sea level. Two levels of gates have therefore been planned for the spillway of the Xaraburi, the first on the surface to control the flow rate, the second at depth to leave as much sediment through as possible.

The dam's opponents had another reason for being angry. What will happen to the fish, one of the country's assets? They will disappear if their route is barred. This is why three concomitant systems have been planned, following lengthy studies to analyse the behaviour of these champion swimmers. A lift, a ladder and a bobsleigh track with which our aquatic friends can amuse themselves to swim up and down the river along more than 270 metres.

The Mekong delta starts immediately it leaves Cambodia and nowhere else is the origin of the word "datnuoc" (country in Vietnamese) better verified: "dat" means earth and "nuoc" means water.

Nowhere else is the omnipresence of the river more visible than here. Without it, no rice paddies, thus no food for a rapidly growing population (Ho Chi Minh City has a population exceeding 10,000,000).

Without the Mekong, the transport of goods would be all but impossible in a marshy region where roads are scarce since extremely difficult to build.

More than 7.3 million people are employed in the delta (the creation of 410,000 additional jobs is foreseen in 2015) which provides 56% of Vietnam's rice, meaning more than 21 million tons of the 38 million tons produced every year. The port of Ho Chi Minh City is quickly becoming one of the largest, since in 2012 it received 4.9 million TEU and a total tonnage of 69 million.



Boats on the Delta

The authorities are aware of the crucial role played by the Mekong in the national economy and the port's obsolete facilities. They are first placing emphasis on the development of river traffic (goods and tourism), with the construction of genuine ports.

By modernising HCMC's port installations and facilitating their access, it will be possible to link the ends of this extremely long country. Vietnam has to transport most of its goods BY THE SEA (called "of the north") to avoid saying the heinous words "China Sea").

Despite the importance of this subject, other more pressing problems exist.

The first is pollution. Rapid urbanisation and industrialisation have led to the discharge of ever-increasing volumes of more and more toxic

effluent into the water, usually without any prior treatment.

The second threat comes from the river, through flooding, an especially critical threat due to the pressure on land, since huge districts have been built in zones liable to flooding every year. This concerns a large part of Ho Chi Minh City.

The third threat is undoubtedly the most serious and comes from the sea, which is swelling and thus rising due to global warming. It increasingly invades the rice paddies since the flow of freshwater from the river is tending to decrease, following the construction of multiple dams upstream. For all the efforts of agronomists to discover salt tolerant species of rice, the moment comes when the plant refuses to grow.

Works can be engaged to overcome these threats. They will be pharaonic, even if the engineers are becoming wiser and starting to accept the idea of "living WITH the water rather than AGAINST it". An idea more revolutionary than one would imagine and which demands the attention of disciplines other than the so-called "hard sciences".

Saigon harbor



Thus, alongside hydraulics and energy engineers, architects and town planners increasingly participate in decisions relating to water, as do sociologists, anthropologists and philosophers of religions. In the framework of decentralised cooperation between the Rhone-Alpes Region and Ho Chi Minh City, a French geographer (of great repute) is finding himself more and more involved in the city's development projects. The construction of dikes, often essential, fails to solve all the problems since water is alive. Versatile and sly, it resists shackles and often finds ways to throw them off. Water is not merely content to cross national borders. It requires efforts between disciplines if we are to have a chance of understanding it.

The crux of this new war for Vietnam remains a lack of money. Following long internal debates and the abandoning of certain old ideological principles, recourse to public-private partnerships is now accepted. Discussions with funding institutions have become a prerequisite for building any project, though this has in no way simplified discussions with the different

administrations. In Vietnam the shift is slower than elsewhere but nonetheless substantial, with cities seeking to gain more autonomy from the centralised State. Observed everywhere, this trend has taken on a new dimension in the old Saigon where the bureaucratic domination of Hanoi is little appreciated, likewise its persistent communism. The further north one goes in Vietnam, the more the spirit of enterprise is bridled.

A large circular inset image showing a wide river valley with steep, rocky banks. The water is a light, milky color, and the surrounding landscape is rugged and mountainous. The entire image is overlaid with a semi-transparent red filter.

RED RIVER

Hanoi

Once one has crossed the bridge over the Red River, the four lanes become a single that rises to penetrate the first suburbs of the capital at the level of the third floor of the houses. This route tells the city's history and geography, of yesterday and of today, because it is a dike. It is a reminder that for centuries, most likely since the 5th, the population has always done everything it can to protect its city against the floods of this very large river. It also demonstrates that urbanisation here hardly conforms to the most basic rules of precaution since houses are built between the river and the dike, meaning on very floodable and often submerged land.

The Red River, Hanoi

Originating in China, where it crosses the province of Yunnan, the Red River is 1,200 kilometres long and drains a watershed covering 160,000 km². Despite its highly erratic flow regime, which can vary from 450 to 30,000 m³, it has always been a privileged route for all kinds of transport at the same time as providing water for thriving agricultural activities to which most of the plain is devoted (80%).



Departure for the site

There are two rice harvests a year: the monsoon crop from July to September, and the spring crop from February to June. Other types of cultivation add a third cycle, including market gardening, maize, mulberry trees for silk worms, and livestock breeding.

Irrigation and flood protection

To fulfil these two missions, two gigantic and permanent projects had to be built and which required a centralised administration. This is how water begat a State very early on. Vietnam is a river civilisation.

As with the Mekong, Vietnam occupies the downstream stretch, the most uncomfortable position where it must tolerate all the whims affecting the upstream stretch, giving rise to great anger (many centuries old) mixed with docility (through want of choice) since these whims are those of a giant, namely China.

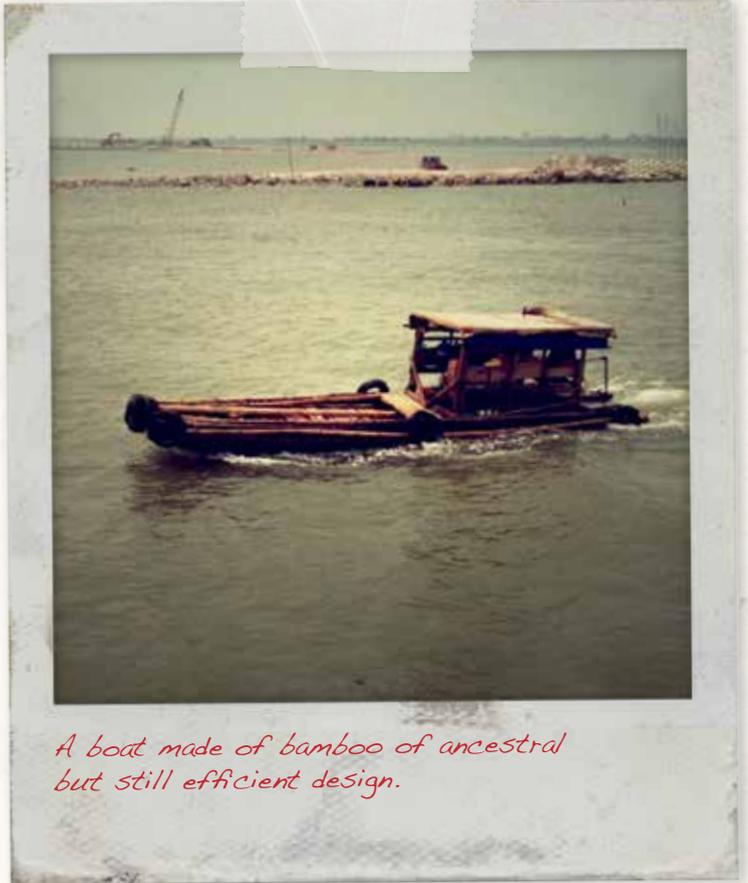
So far, the Big Neighbour has not taken much interest in the Red River as a source of hydroelectricity and the flow rate has not fallen. On the other hand, the industries of Yunnan consider it as a perfect outlet into which they discharge their wastes without the least

concern given to treatment.

Thus the water entering Vietnam is heavily polluted.

We drive on to the sea. The sky is grey, which is often the case in the delta.

Nothing on this Earth is as flat as a plain of rice paddies. No surface is as criss-crossed by water in canals of all sizes and branches of rivers; and no green is as tender, especially as we are at the end of March. As far as the horizon, the same bent, loaded and broken silhouettes repeat the same age-old movements of transplanting. As far as the eye can see, plastic bags have been suspended from poles to drive away pilfering birds. The surface of this huge green mirror is punctuated only by churches, some of which are very big, almost cathedrals. And there are cemeteries, little islands of the dead, towns of steles and miniature coloured palaces. The Gods and the departed are entitled to vivid colours while the living must content themselves with dark clothes and cream white hats made of rice



A boat made of bamboo of ancestral but still efficient design.

straw. The rice gives protection from the sun which makes the rice grow. Buffalo graze, making one jealous of their calm lives. True, they do nothing but chew and ruminate while awaiting the slaughterhouse. The bicycles have all but disappeared, replaced by mopeds.

From time to time, in the heart of the village, the might of a huge construction dominates the small neighbouring houses. It is an administrative palace. Chimneys more or less everywhere signal the existence of brickworks. A delta has no stones but one must build nonetheless. There are more and more ponds and fish farming is developing. A tiny ferry is used to cross the river. We are told it is called the NINH CO, a distributary of the Red River that flows into the sea five kilometres further on.

In 2011, as lead company of a consortium including TRACTEBEL, CNR won the international call for projects to develop the basin: the construction of a connecting channel, a bridge, the renovation of two river ports (VIET TRI and NINH PHUC) and the protection of the navigable channel at the outlet of the River NINH PHUC.

A Vietnamese partner was chosen as subcontractor. These are the last works we shall inspect. They are urgent as the number of typhoons is increasing. Each of the latter gnaws away the coast which recedes several



Plan of a river-maritime dike

hundred metres a year. A serious delay was observed during a visit last November. Besides the problems of tides and bad weather, the main reason for the delay was due to the fragmentation of the tasks involved. Without asking for CNR's opinion, the Ministry of Transport divided the works between no fewer than 12 local companies of unequal expertise and, for the most part, having no experience of

maritime works. It's a difficult task to get so many companies to advance together, especially regarding the schedule.

This time the news is good and CNR can demonstrate its expertise to the full. The deadlines (31 December 2015) will be met. The dikes have progressed well, consolidated by thousands of "haros", concrete blocks made locally. Land is reclaimed from the water by tipping sediment dredged from the river. After conducting a detailed survey of the population's demands, the dikes will be planted with *Casuarina equisetifolia*, a cousin of the tamarisk tree. This plant has the threefold advantage of tolerating salt well, growing quickly and providing thorns ideal for drying fish. Furthermore, it provides wood and thus satisfies a host of needs.

The old Vietnamese technique was different. Mangrove trees were preferred to *Casuarina* and were left to advance seawards little by little. Mangroves were deemed of sufficient size and a dike was built in their midst. They were left to develop beyond the dike, as it was wisely held that there was nothing better for repelling the

aggression of the sea. Before the dike, the land was cleared and then cultivated. Attempts were made to carry on this method but impatience was punished.

Too much land was reclaimed without leaving a sufficiently wide strip of mangrove. Everything was destroyed when the first storm came. (...)



Works on a dike

Another consequence of the reduction of the mangroves was the exhaustion of fish stocks : fishes, shrimps and molluscs thrived in this nutritious environment. The fishermen have turned to fish farming. But because they saw too big too quickly, diseases developed, requiring the massive use of costly antibiotics. The project is now progressing at a good pace and the concerns of the team are turning to future funds. The interest rates have remained very low and the profitability of the loans has dwindled.

The main funding institutions, including the World Bank, are worried : won't they have to reduce their social and environmental requirements if they are to keep the barest margin (and their clients)? Competing Chinese funds do not include such demands.

So what if safety recommendations are ignored!
So what if the construction sites pollute!



Signature of the Moll (Memorandum of Understanding)

And why lose one's time and money in AIDS prevention programmes, even if the uprooted workers are highly exposed to the risk?

Every one to their own job.

For these funds, the aim is simply to increase the number of borrowers and thus the volume of business.

The team of CNR and its partners are not among those who admit defeat. The developers have seen other projects before this one and work proudly for future generations in a world increasingly subject to the violence of Nature. They know that by touching a river, they touch the heart of a nation, the heart of its noble ambitions and of its main diseases: bureaucracy and corruption, two characteristics we know are not contradictory.

Breakfast will be taken in a charming small inn, a place much appreciated by karaoke fans in the evening. Right now, bonsais offer their tortured shapes and birds and sing in cages. Oh, isn't this little chained monkey charming!

Luckily it knows nothing of its very short-term fate: that of having its skull opened and its brain eaten raw by enraptured gourmets.

Sustainable development is not much concerned with animals.

