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Assessment on the Impact of Dam-Building on Environmental Change at Souapiti/Kaleta in Republic of Guinea

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Abstract: Due to special geographic position, variety of landscapes and abundant rainfall (1,400-4,000 mm year^{-1}), Guinea, water tower of West Africa, possesses plenty of water resources. With total of 19300 GWh for a reliable power, less than 1% of which has been exploited by now, major projects are under studying and need hydroelectric potential assessment. The installations are already operating, but only Garafiri has been the subject of an environmental impact assessment and a monitoring study (currently under way). The Samou hydroelectric system, in operation for more than 15 years, has never been the subject of an environmental assessment. Hence, the future hydraulic dams at Kaleta/Souapitti with a capacity of 710 MW, an environmental assessment on the project feasibility should be required. This study is a strategic environmental assessment on the impact of hydropower on the bauxite mining and local environmental ecology by comparison with Three Gorges Dam in China and Aswan Dam in Egypt. Our results demonstrate the way how to complete environmental assessment and how to keep sustainable development based on natural resources management.

Key words: Waterpower, environmental assessment, Garafiri, souapiti-kaleta, Three Gorges Dam, Aswan Dam

INTRODUCTION

In some areas of the world, hydro-electric power is the main source of electricity. More than 35 nations already obtain more than two-thirds of their electricity from falling water.

In South America, 73% of the electricity used comes from hydroelectricity power, compared with 44% in the developing world as a whole. Norway gets 99% of its electricity and 50% of all its energy from falling water.

It's important to recognize that the construction of a reservoir for hydro-electric plants may produce environmental and social problems, including loss of fertile farmland, destruction of the natural aquatic ecosystem, relocation of entire communities and a reduction in the amount of nutrient-rich silt deposit on downriver agricultural lands.

The building of the Tellico Dam in Tennessee was delayed for several years because it might have caused the extinction of snail darter, a fish that lived only in streams that would be flooded. The construction of the Aswan Dam in Egypt resulted in the displacement of 80,000 people. It created an environment problem of increasing schistosomiasis, a waterborne disease caused by flatworm parasites that spend part of their life cycle in snails that live in slowly moving water.

The irrigation canals built to distribute the water from the Aswan dam provide ideal conditions for the snails. Now, many of the people who use the canal water for cooking, drinking and bathing are infected with the flatworm parasites.

China has been being constructed a huge hydro-electric dam, known as the Three Gorges Dam, on the Yangtze River. It is the largest hydroelectric dam in the world.

Even though a hydroelectric project causes environmental problems, new sites continue to be developed. To reduce theses causes, the environmental assessment is one of the solutions.

Republic of Guinea knows serious deficiencies of electricity production. However, for its development nation needs energy and this, continuously. This is the main reason that the government decided to implement a great hydroelectric project which will make it possible to provide electricity power in lower Guinea (includes Conakry the capital and where current failures are still

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frequent) and in Middle Guinea. The priority is related to bauxite exploitations (Victor Afonso, 1997-1998).

So, the hydroelectric power Dam called Kaleta/Souapiti in Republic of Guinea will necessarily needs a deep study of environmental assessment.

Hydropower history: Hydropower started with the wooden waterwheel .Waterwheels of various types had been in use in many parts of Europe and Asia for 2,000 years, mostly for milling grain. By the time of industrial Revolution, waterwheel technology had been developed to fine art and efficiencies approaching 70% were being achieved in the many tens of thousands of waterwheels that were regular use. Improved engineering skills during the 19th century, combined with the need to develop smaller and higher speed devices to generate electricity, led to the development of modern day turbines. Probaly the first hydro-turbine was designed in France in 1820 s by Benoit Fourneyron who called his invention a hydraulic motor. Towards the end of that century many mills were replacing their waterwheels with turbines and governments were beginning to focus on how could exploit hydropower for large-scale supply of electricity. The golden age of hydropower was the half of the 20th century, before oil took over as the dominant force in energy provision. Europe and North America built dams and hydropower stations at a rapid rate, exploiting up to 50% of the technically available potential.Hundred's of equipment suppliers sprung up to supply this booming market (Paish, 2002). As this chart shows, Africa continent have only developed 10% of its hydraulic potentialities and Europe 90%. Some countries in Africa like the Republic of Guinea, could develop and exploit their hydraulic reserves, because they have enormous hydraulic potentialities (Fig. 1).

As this Fig. 2 showing how the Republic of Guinea has many rivers and streams. The principal rivers in western Africa are taking their spring in Guinea, like the Niger (4200 km), the Senegal (1770 km) and the Gambia (1200 km) and many streams: The Bafing in Mali, the kolente, Sewa in Serra-Leonne, the Makona and the Diani in Liberia. The Republic of Guinea is called Tower water of Africa western. The Kaleta/Souapiti dam will localize on Konkoure river (370 km) in Lower Guinea because of it important hydraulic potentialities.

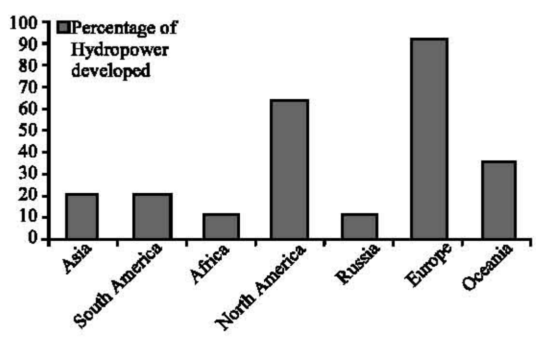

Fig. 1: Developed hydroelectric sites in 2001(Source: Data from Survey of energy Resources, World Energy Conference, 2001)

Historical regional background

Climate: The climate of the area concerned with this dam is typically a tropical climate. This one is characterized by a high annual average temperature of 24, 4 Celsius degrees (this one varies little during the year with a maximum in April and a minimum in August) and an important annual pluviometry even very important (2060 mm per year), concentrated on only one wet season or wintering (the beginning of May to the end of October). The Annual average relative humidity oscillates from 70-78%. During this period, monsoon generates important precipitations. So, the flow rate of some rivers will vary according to the pluviometry, like the Konkoure River where the future dam will build. (The Konkouré River is a river in west Africa. This river originates in west central Guinea, West Africa and flowing in a westerly direction 303 km to the Atlantic Ocean).

The importance of precipitations and the reliefs very uneven and contrasted of Fouta-Djalon explain the relative abundance of surface water particulary in Low and Middle Guinea where the majority of the large rivers of West Africa take their source: Niger, Senegal, Gambia and Casamance, as well as the rivers of the Southern side of massif (Mano, Mongo, etc). Konkouré River which passes to Fria is the most important river of Low Guinea. The coastal plains being very low, the coastal rivers have the characteristic to be subjected to the mode of the tides on the whole of their courses downstream (50 and 40 km for Cogon and Tinguilinta), this phenomenon has for principal consequence an important contribution of water salted inside the grounds during the low water level. The small rivers or backwaters with temporary flow have an extremely high density but much are drained March at May or do not remain any more but in the form of pools or of under very limited flow. Broadly these rivers and streams have an annual flow of about 350 billion m^3 which for the majority go towards the boundary countries including approximately 40 billion m^3 in the Basin of Niger in Mali. The river generates electricity from the Garafiri Dam, a second hydroelectric dam in planned for construction on the river near Kaléta]. They are 60% of the rains which fall over a short period 3 months: July, August and September. During the dry season (the

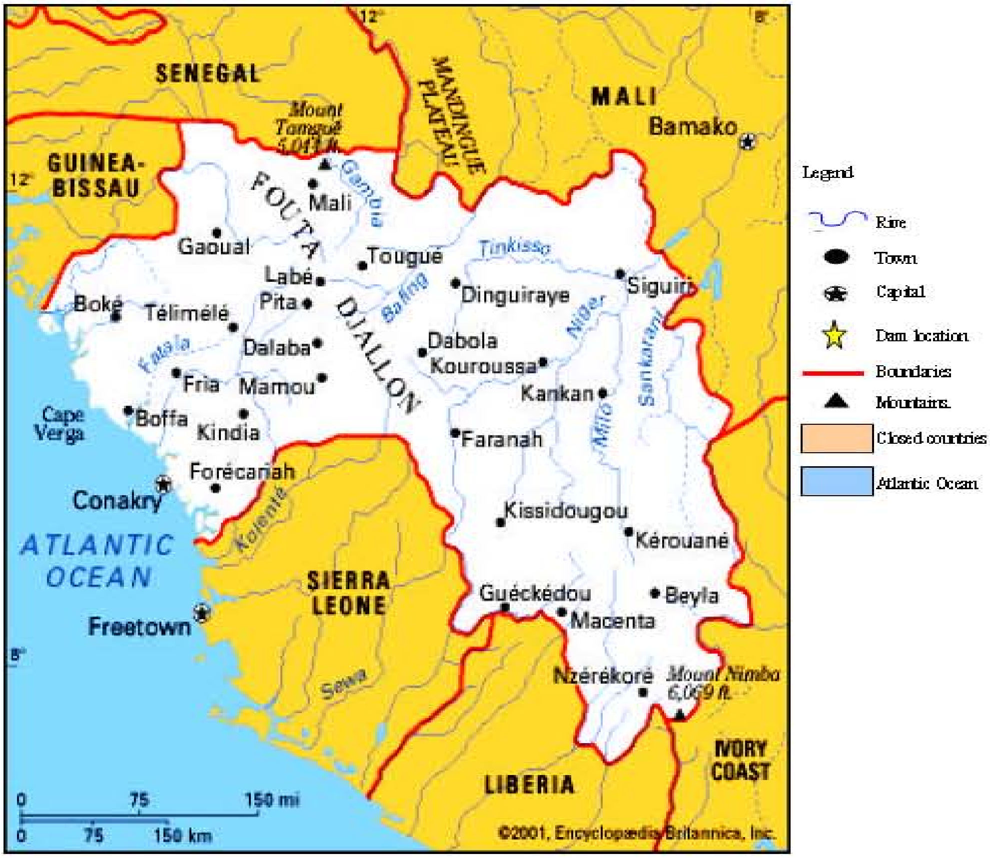

Fig. 2: Hydrography map of republic of guinea (Source: 2001, encyclopaedia britannica, inc)

beginning of November to the end of April), it practically does not rain, except for some stormy showers during the months of transition from April and November (one observes 4 months of pluviometry lower than 50 mm).

The importance of these rivers is especially related to the local pluviometry with a shift of the order of the month. Their risings take place in August-September like the Konkoure River (Fig. 3). The flows of a river as Konkouré can be higher than 1000 m^3 sec^{-1} in August and September.

Between this period of hydrological maximum and the low water level, located in March-April, the flow varies from a factor 100-200 according to rivers (Fig. 3). The mouths of these rivers constitute fishing zones very attended for the capture of the majority of the species (Pseudotolithus elongatus, Pseudotolithus typus, Ethmalosa fimbriata, Sardinella maderensis...).

Geology and pedology: The morphogenesis of this area is located in Fouta-Djalon South-west is rather complex. The Precambrian granitic basal was covered by sedimentary sequences with primary education age (sandstone and schist). The unit was then crossed locally by basic eruptive intrusions primarily doleritic, thus inducing a metamorphism of contact and from the corneal ones (for the more argillaceous rocks) and of quartzite (for the more siliceous rocks). All these rocks (eruptive, metamorphic or sedimentary) then underwent tectonic movements and of erosion which is at the origin of the faulted landscapes and in steps that one can observe at the present time. During the tertiary sector, all this area will be affected by an intense laterisation and the formation of a thick material cover comprising various levels of accumulation and ferralitic armours. This process can take place only in areas like this one, where seasons dry and wet seasons are alternated regularly (strong seasonal contrasts) thus allowed the practically complete deterioration of primary education minerals (except quartz). Phases of intense erosion then pickled a part of these materials, revealing the ferralitic armour on the surface. This morphogenesis complex largely conditioned the distribution and the soils characteristics of this zone. Schematically, we have three great types of more or less advanced soils:

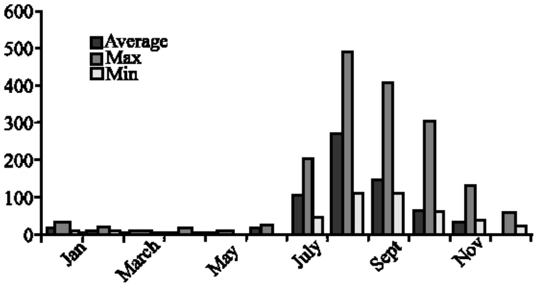

Fig. 3: Koukouré River monthly's flow rate ($m^3\ s^{-1}$) in Kaleta site 1948-1995(Hydroconsult International, 1996)

- Lithosols strongly eroded and impoverished of nutritive elements (of which phosphorus), located in the zones plates, where the ferralitic armours exist.
- Ferralitic soils of the slopes and the valley slopes (from 10-30%). These are generally deep argillaceous grounds, very deep and whose phosphorous poverty is known.
- The fluvisols not very deep of valley and overall richer in nutritive elements than the two previous soils.

Description of souapiti/kaleta's project: The Souapiti/Kaleta sites are located on the central reaching the Konkoure River, about 35 km downstream of the existing bridge on the Kindia-Télimélé Road and 135 km upstream of the river mouth, about 115 km northeast of Conakry, in the Republic of Guinea, West Africa.

The Souapiti site is about 6 km above of the stream of the Kaleta site. At the Souapiti site, the valley narrows, the project arrangement proposed would consist of a CFRD (135 m high), a power intake structure with its approach channel, three steel surface penstocks, 5 units (450 MW) powerhouse and a spillway.

The Kaleta site is a series of waterfalls just like downstream of a widens of the valley. It consists of a wide rock sill (about 700 m long at riverbed level), which creates a natural head of 40 m. At this point, the river is divided into several branches cutting into the rock, creating varied numbers of waterfalls depending on the river discharge (Fig. 4 Photo of Kaleta/Souapiti site). The river elevation upstream of these channels is close to El. 100 and the level below the falls is around El. 60. The Kaleta site consists of a 17 m high Roller Compacted Concrete (RCC) dam, an intake structure feeding four steel surface penstocks, a 4 unit (186 MW) powerhouse and a spillway (Rahim, 2002).

Socio-economics' zone of kaléta: The zone of Kaléta's study is concentrated on the prefectures of Dubréka and Fria, which shelter the zone of the tank and the works. The project will directly influence only two villages (Kassia and Kaléma), very wedged, which add up approximately 400 people and indirectly four others (Ouendékouré, Kabéa, Kaléta and Kounfayia). The road alignment will affect several villages and small hamlets located on its layout. The number of people living below the poverty line remains very high in the major part of the zone of the study. The dominant agricultural products are rice, corn and manioc. The truck farming and river fishing punctually occupy certain residents of the rivers (African Development Fund, 2005; ADF/BDF/WP2004/177 and Memorandum of multinational).

Kaleta/souapiti's dam: The water reserve of the Kaleta/Souapiti complex would cover a surface of 780 km^2 and a volume of 17 billion m^3 of water, that is to say, 6 times more dam of Manantali in Mali on the river Senegal. Many diseases of hydrous origin like malaria in the upstream of reserve and the onchocercias in the downstream because of the changes of the hydrological cycle dam, at the speed of the water increased downstream throughout the year. 75000 people, from 257 villages from 18-700 people would be migrated into the areas of Sangaréya, Madina Oula and the valley of Kollenté (Aqua-Expo, 2000). The supply of water and their health would be the critical investment aims in their reception zone (drillings, infrastructures, personnel), but what will it be of their follow-up (perennially) whereas in Manantali, once the illusions of the building site dissipated, the medical infrastructures socio will be with the abandonment and the downstream of the epidemic of bilharzias on more than 1 400 km is described as true tragedy by the epidemiologists? Whereas many studies underline the harmful effects of displacements of population with Manantali in Mali and for other African dam in Ivory-Coast and in Ghana, not far from Guinea and the consequences for the populations downstream, fishermen, farmers or stockbreeders, it is advisable to pay attention to the disproportion of such a project whose certain experts underline already the low level of feasibility.

The principal ones objectives of this study:

- Show the current importance of hydroelectric installations in the economic development.
- Environmental protection in the execution of this project.
- The development of renewable energy.

Fig. 4: Photo of Kaleta site (Data source: Abdoulaye. Diallo, 2006. OMVG, Forum Dakar)

MATERIALS AND METHODS

This working method is based on the study of the perceived documents and consulted sites and in comparison with another's hydroelectric dams (Three Gorges dams in Republic of China, largest hydroelectric dam in the world, Aswan on the Nile) to refer to the executive process of these dams.

Let discuss some environmental impacts of hydroelectric power dams: While wide variations occur from site to site, the impacts of dams on environment can be divided into two categories: Those due to the existence of the dam and reservoir and those due to the pattern of dam operation.

Impacts due to existence of dam and reservoir: Upstream of dam, the imposition of a reservoir in place of a river valley. Dams have flooded a vast area of land -- approximately 400,000 km^2 worldwide. These have included terrestrial and river ecosystems of every habitat type, including a considerable tropical forest habitat, particularly in Latin America and Southeast Asia, with its particularly rich biodiversity. Especially the fact is significant that the land lost is of importance out of proportion to its size, including river habitats and terrestrial habitats on floodplains along banks of rivers, that are often among the most diverse ecosystems in world. These habitats are replaced by a relatively uniform reservoir, which will usually provide habitat for a much smaller range of species.

Sediments flux and depositional environment changes in downstream of riverbed and banks, delta, estuary and coastline due to altered sediment load.

Most of the impacts of dams on downstream habitats are leading to changes in the sediment load of the river. All rivers bring some sediment as they erode their watershed. While, the river is held behind a dam in the reservoir for a period of time, most of the sediment will be trapped in the reservoir, even to the bottom, so that water released by the dam will be much clearer, with less sediment than it has once had. For example, before the High Aswan Dam the Nile in poured an average of 124 million tons of sediment to the sea each year and deposited another 9.5 million tons on the floodplain; now, 98% of the sediment goes into the bottom of the Nasser Reservoir. Clear water down a dam is said to be hungry: It will recapture its sediment load by eroding the downstream bed and banks. Eventually, easily eroded materials on the riverbed below the dam will be taken away, leaving a rocky streambed and a hard condition for aquatic fauna. Erosion may also increase along the coast beyond the mouth of the river. For example, downstream of the Akosombo Dam in Ghana. Overtime, the downstream river will also tend to become narrower and deeper and will also reduce the diversity of animal and plant life that it can support.

Quality changes in downstream water: Effects on river temperature, nutrient load, turbidity, dissolved gases, concentration of heavy metals and minerals.

While, river water is held in a reservoir for a period of time, the quality of the water will be affected in several ways: The temperature changes, nutrients are removed, forests are flooded and decompose and there may be colonization of the water by aquatic plants. Each of these effects may have an impact on the life that depends on that water. These effects are generally related to how long the water has remained in the reservoir. Particularly severe effects can occur when a reservoir is first formed and submerged vegetation and soil decomposes. As it does so, it will deplete oxygen in the reservoir water. Deoxygenated water can be lethal to fish downstream.

Another water quality problem involves mercury contamination. While, mercury often exists in a harmless inorganic form in soil, once the soil is flooded, bacteria may transform this inorganic mercury into methyl mercury, which is toxic and can be absorbed, concentrated and passed up the food chain. According to Canadian scientists, in every case studied, the concentration of mercury in fish has shifted from before the reservoir was constructed, to after.

Loss of biodiversity due to the barrier of dam and the above changes. Perhaps the most significant environmental consequence of dams is that they tend to fragment river ecosystems, isolating species populations living up and downstream of the dam and cutting off migrations and other movements. However, the special importance is the barrier of fish migration going through the dam. Therefore, the dam may be an enormous obstacle, producing great impact on fish populations. For example, one immediate impact of settlement on Lake Ontario fish populations in the early to mid-19th century was elimination of dozens of salmon runs in streams flowing into Lake Ontario, as these streams were blocked by milldams. This experience has been repeated dozens of times since then, on rivers all over the world.

Almost, all dams also reduce normal flooding, effectively isolating the river from its floodplain and eliminating the ecological benefits provided by this flooding.

The impacts of these changes are magnified by changes in the flow pattern of rivers downstream that is caused by normal operation of dams. These changes, whether in total stream flow, in seasonal timing, or in short-term, even hourly fluctuations in flows, generate a range of impacts on rivers. This is because the life of rivers is usually tightly linked to the existing flow patterns of rivers. Any disruption of those flows, therefore, is likely to have substantial impacts.

For example, in Canada, rivers typically have their greatest flow in spring, at snowmelt and their lowest flow during the winter. The function of dams, on the other hand, is to hold back this spring flood and release it during winter, when demand for hydropower is at its greatest. As a result, the spring flood is greatly reduced, while winter flow may be greatly increased. Superimposed on this seasonal change are fluctuations in flows and levels, sometimes hour by hour, in response to changing daily demands for hydropower. The result is that existing rhythm of the river, in its ebb and flow, is disrupted and along with it, all the habitats and species that depend on that rhythm.

Table 1: Effect area and some diseases due of impact area of dam's building

Impact Area	Effect of dam	Health impact
Upstream Catchment and river	Loss of biodiversity,increased agriculture,sedimentation and flooding,changes in river flow regime	Changes in flood security,water-related diseases, difficulties with transportation and acces to health facilities
Reservoir area	Inundation of land,presence of large manmade reservoir,pollution, changes in mineral content,decaying organic material,pollution	Involuntary resettlement,social disruption,vector-borne diseases,water-related diseases,reservoir-induced seismicity
Downstream river	Lower water levels,poor water quality,lack of seasonal variation, loss of biodiversity	Food security affected on flood plains and estuaries(farming and fishing),water-related diseases,dam failure and flooding
Irrigation area	Increased water availability and agriculture,water weeds, changes in flow and mineral content,pollution	Changes in food security,vector-borne and water-related diseases
Construction activities	Migration,informal settlement,sex work,road traffic increase,hazardous construction	Water-related diseases,sexually transmitted diseases, HIV/AIDS,accidents and occupational injuries
Resettlement areas	Social disruption, pollution, pressure on natural resources	Communicable diseases,violence and injury,water-related diseases,loss of flood security
Country/regional/global	Reduced fuel imports,improved exports,loss of biodiversity, reallocation of funding,sustainability	Macro-economic impacts on health,inequitable allocation of revenue, helth impacts of climate change

Source: Based on Oud and Muir 1997

Health issues: Large dams influence health at not only the reservoir site but also upstream, downstream and at national or even regional levels (Table 1). Increases in the prevalence of schistosomiasis, malaria, encephalitis, hemorrhagic fevers, gastroenteritis, intestinal parasites and filariasis (including onchocerciasis and bancroftosis) have been documented after dam and irrigation projects. Large dams also influence the health of animals through increases in diseases such as river fluke in cattle and changes in the distribution of trypanosomiasis (Stanley and Alpers, 1975). Changes in water flow, river ecology and salinity, easier travel due to navigable dams and rivers, human proximity, pollution, canalization and agriculture allow vector-borne diseases to flourish in the tropical or subtropical environments of less-developed countries, where most current dam buildings are taking place (Brantly and Ramsey, 1998; Hunter *et al*., 1993, 1982; Hunter, 1992). For further discussion of dam and irrigation-related diseases, the reader could refer to Stanley and Alpers (1975), Brinkmann *et al.* (1988), Parent *et al.* (1997), Vercruysse *et al.* (1994), N'Goran *et al.* (1997) and Brantly and Ramsey (1998).

Households living closed to reservoirs may lose access to river water and natural springs can be destroyed or dried up. The failure of water supply leaves communities with unsafe water sources, a dreadful consequence of a water-transfer project. Villages often are given only the most basic water and sanitation options (such as covered springs and VIP latrines), although they may be situated adjacent to construction camps that have a reticulated water supply. Communities resettled due to dam construction mostly are moved inland, away from rivers that previously provided a reliable water supply. Rural resettlement areas may have insufficient water for both the preexisting local population and newcomers and this can cause outbreaks of cholera (such as those that have repeatedly occurred in the Lake Kariba resettlement areas) and other water-related diseases. Dam construction results in the loss of fields and grazing land. In areas where nutritional status already is poor, food supplements may be necessary to protect infants and children.

Table 2: Resettlers numbers of some dam's projects

Project	Country	Numbers of resettlers
Three gorges	China	1,250,000
Upper krishmaII	India	220,000
Sardar sarovar	India	127,000
Aswan high	Egypt	100,000
Kossou	Ivory coast	85,000
Akosombo	Ghana	84,000
Longtan	China	73,000
Mahaweli (1-5)	Sri lanka	60,000
Kariba	Zambia and Zimbabwe	57,000
Sobradhino	Brasil	55,000

Source: Based on Scudder (1997a)

Resettlement, compensation and development: Involuntary resettlement remains one of the most serious outcomes of large dam projects (Table 2). Those forced from their homes by construction and inundations often are ignored; it is assumed that they somehow will benefit from the dam. There are numerous cases to illustrates it. For instance, dam resettlement has been carried out under the threat of violence and little, if any, compensation was provided. Resettled families lose homes, land, food sources and employment and they are exposed to social dislocation (Baviskar and Singh, 1994; Cernea, 1990).

Communities that host the resettles face increased population densities, which places severe pressure on natural resources and water and sanitation infrastructure and results in an increased incidence of communicable diseases. Resettled families, unable to plant seasonal crops for subsistence agriculture, are forced to purchase foodstuffs. There is evident, in a long-term study of the Kariba Dam, that resettlement causes an earlier increase in mortality rates (Clark *et al*., 1995).

The impact of the dam on the evolution of the konkouré river's estuary: In June 1999, a hydroelectric dam was constructed 130 km upstream from the river mouth during the wet season. Some observations suggest that the discharge have been weakly reduced during the rainy season. The following data deals with monthly values (from 2000-2002) compared to mean values since 1953. During the rainy season, dam-induced peak discharges are -40% and -17% on August and September. On the other hand, the discharge increases strongly during the dry season, with values of + 265% and + 278% during March and April. Rainfall during the years 2000-2002 (2890, 3640 and 2340 mm, respectively) was low, compared to mean annual rainfall as calculated using data from 1922-1995 (3980 mm). Therefore, the decreased river discharges in the wet season are not simply due to the dam construction. Because of the small dam retention effect (14% of the Konkouré catchments area) part of the river discharges due to the dam are not likely to be very significant (Capo *et al*., 2006)

Concerned with the increasing energy prices, balance of payment problems and reliability of energy supplies, many countries are reassessing the role of hydroelectric energy within national energy policies. Since, hydroelectric generation does not consume water, the projects-nce developed-an be used to provide water for agricultural and industrial developments, 2 major problems faced by all developing countries. While, the primary impacts of the majority of hydroelectric developments have been beneficial, it is now evident that they have also contributed to several adverse environmental effects. Two such major environmental impacts are discussed: Problems due to erosion and sedimentation and implications of inundations, especially in terms of resettlement (Asit, 1982). For example, let discuss about environmental impacts of the Three Gorges Dam in Republic of China.

The three gorges dam: A project that began in late 1997 is already being compared to the building of the pyramids and the Great Wall of China. China's Three Gorges dam across the world's third longest river, the Yangtze, is a project that it will be visible from the moon and will be the largest dam in the world. The Three Gorges Dam will stretch 2 km (1.3 miles) across the Yangtze River, tower 185 m (610 feet) into the air and create a 600 km long (385 mile) reservoir behind it. The dam is expected to cost in excess of $ 40 billion before the estimated date of completion in 2009. The government of China contends that the dam is in urgent need for several reasons.

The primary reason is that the 18,000 MW of electric power that the dam will generate. China's rapidly increasing economy indispensable needs the energies for its expending industrial centers. It is also argued that the project will transform the Yangtze River, especially the upper regions, into a more navigable and hence, economic waterway. The final major argument for the dam relates to flood control in the middle and lower reaches of the river. These parts of the river have been prone to frequent and disastrous floods. The economic arguments, however, are not the only issues being debated in relation to the Three Gorges Dam.

Scientists in China and from others nations have warned that the project could threaten migratory fish, concentrate water pollution and endanger to the point of extension the Chinese alligator, river dolphins, the Siberian white crane and the Chinese sturgeon. Environmental concerns relating to the project were instrumental in the 1993 decision of the United States to withdraw technical assistance. The impact on the regional Chinese population is also a critical issue. Upon completion, the lake formed by the dam will inundate 153 towns, 4500 villages, numerous archeological sites and the scenic canyons of the Three Gorges that inspired poets and painters centuries.

RESULTS AND DISCUSSION

The goal of science is to discover universal truths which are the same as yesterday, today and tomorrow. Hopefully, the knowledge obtained can be used to protect the environment and improve human life quality. To identify these universal truths, scientists observe and make measurements about the physical world (atmosphere, water, soil, rock) and its living inhabitants (flora, fauna- and the process of work), mass wasting, deforestation, urban sprawl, human construction projects. Our study is taking place in this same order of idea.

The Kaleta/Souapiti site in Republic of Guinea where the hydropower dam will build needs a particular attention, a deep assessment study despite an important advantage this project can occur.

The findings of this study are to assess the future of hydropower dam, to alert people on dam in Republic of Guinea where the environmental assessments word is not popular.

To give our study a concrete form we need to consider two great aspects on hydropower dam site:

Natural environment: Here, some details about these elements are necessary to know.

- Local climate.
- Water quality.
- Environmental geology.
- Sedimentation.
- Terrestrial plants.
- Terrestrial animals.
- Aquatic biota.
- Water logging.

Social environment: In this case, it's necessary to get more details about these aspects:

- Environmental benefits.
- Constructions activities.
- Landscape and culturage heritages.
- Public health.
- Inundation and resettlement.

To succeed and to reach our aim, some environmental assessment studies of hydropower dams like Three Gorges (Rep.of China). Aswan (Egypt) can be the references. But some difficulties can enumerate during the area's investigations:

- Data collection.
- Data checking.

The excepted results following:

- Creation of the dam of Kaleta/Souapiti.
- Production of electricity.
- Production of bauxite mineral.
- Development of renewable energies.
- Environmental protection.
- Applying Environmental assessment.

CONCLUSION

The project of Souapiti/Kaleta complex haunts the Guinean spirits for a very long time. Now almost a century ago, since the first Guinean regime with the support of French, wished to build a dam at these places in order to provide electricity to the populations and to feed mining industries in electricity, because Guinea is the second world producer country of bauxite. But, several studies related to the impacts of the project and those showed that the repercussions of the construction of this dam could be positive as much like negative on the environment, comparatively with the Three Gorges dam in Republic of China, whose environmental consequences are topical.

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