REPORT ON PRIORITIZED AND GROUPED ENVIRONMENTAL THREATS BASED ON DESK REVIEW:

The Nile and the environmental threats weighing on it.

(ENGLISH VERSION)

PROJECT: Nile Basin Initiative – Nile transboundary environmental action project: Development of e-learning materials for secondary schools

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The present document has been created within the framework of the Nile Transboundary Environmental Action Project (NTEAP)

It is the result of a review of the following documents :

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The Nile and the environmental threats weighing on it.

This report described the environmental threats as they are presented in the documents related to the Nile Transboundary Environmental Action Project (NTEAP). The intent of the document is to present, in a simple manner, the environmental threats, prioritize and group them, and describe the general structure of the content for the eLearning course on that theme.

Training Plan

The series of four courses that will be developed in the frame of this project aim at increasing awareness, in high school students living in the Nile Basin Region, of the environmental threats that exist in their region in order to help them understand them, identify how they are affected by them, and teach them how to act positively towards their environment.

The four groups of problems identified in the Transboundary Environmental Analysis (TEA) and on which the Nile Transboudary Environmental Action Project are founded are: (1) land degradation, (2) water degradation, (3) natural disasters / catastrophes, (4) loss of biodiversity. While all environmental problems are interrelated and must be considered as part of a whole, the order in which they were named was not drawn by chance, but in order to give coherence to these complex issues by inserting them into a track, a story that the learner will be able to follow.

The course narration for each threat will start by a general overview of the Nile Basin relating to the threat under discussion. As such, the training on land degradation will, in its first section, detail the geographical characteristics of the Nile Basin, the training on water degradation will look at Basin hydrography, that on natural disasters will discuss the Basin populations and at last, the section on biodiversity will explore the regions ecosystems. This introduction, though short, will be essential to the learner because it will give him/her a general portrait of the greater natural elements related to each threat. Further, that introduction will tie in to the popular adage of ‘act local, think global’, while having faith in the fact that youth using the course will be able to act in their respective communities while keeping the panoramic view of the picture in which their actions are taking place

Each of the courses will start by defining the main environmental problems of the section while giving them a grade on a severity scale. The student will then have an idea of the material to come, which will be given more depth throughout the course. As a summary, a short quiz synthesizing the material will close each of the four sections.

General Overview

Along with the Amazon and the Yangtze, the Nile is one of the most important hydrographic systems on the planet, possibly even the longest, if one measures from its source to its estuary.

It is also singular by its south-north axis which takes it across a great variety of climatic regimes, from the tropical monsoons of the Indian Ocean to the solar aridity of the deserts. To each of those climates are associated extremely different ecosystems: tropical rainforests, swamps, savannah, high plains, deserts, all of which sustain human activity and without which human activities would not be possible.

The historical importance of the Nile is also of central importance, because without it, many civilizations, including the imposing Egyptian civilization, would never have had the opportunity to develop. The Nile waters, and the lands they irrigate, are responsible for the extraordinary wealth in flora, fauna, and the cultures that rest on its banks. The most important hordes of terrestrial megafauna are nourished, from near or far, from the Nile hydrographic basin; many vegetable and animal species are endemic to its region. Even the emergence of our species, *Homo sapiens*, can be drawn back to the Nile, making mankind its offspring!

If that overabundance of life gives the Nile its greatness, it is also responsible for the fascination it holds for societies. In fact, today, over 160 million individuals live in and share the Nile basin, split among 9 countries. Such strong demographic pressure leans on the Basin's natural systems, and in turn, shoves human establishments.

By wearing on the system, human are degrading the luxuriant basin on a massive scale, threatening to cause abrupt breaks in the services rendered by the natural milieus of which they are nevertheless dependent. As a consequence, the degradations caused by human activities, both local (deforestation, overgrazing, etc.) and global (climate change, etc.) are aggravating factors in the spiralling of the political tensions that haunt the region.

1. Land degradation

1.1 Deforestation

Without a doubt the most dire environmental problem of the Nile Basin because as habitats are destroyed, deforestation paves the way for ever greater complications. Everywhere outside of protected areas, the forest cover is diminishing to make way for cattle (grazing) or agriculture and land (arable land). This continues to be a determining factor of the problems weighing on the region, especially soil erosion (point 1.2) and the irreversible loss of biological diversity (point 4). The deforestation can mainly be observed in western Ethiopia (highlands), in northern Sudan and in the Democratic Republic of Congo; however, in broadening this phenomenon to the destruction of forest cover and to the subjecting of land to human use, all the inhabited regions of the Basin are affected by it.

This situation can be attributed to a number of factors of different orders: the high demographic pressure which characterises the Basin and the deep ecological footprint associated to it; the poor management of insufficient protection of the natural resources by governments and other

environmental agencies; the absence of energy alternatives to the use of firewood, poverty and the imperatives of survival. Although it is important here to nuance the role generally attributed to the poor in the deterioration of natural environments and account also for the effect of the tenuous regional geopolitical situation that often provokes large scale population migrations, the climatic and topographical realities, and the ignorance and lack of awareness surrounding the adverse retroactions engendered by the destruction of common natural wealth.

1.2 Land erosion

Land, in conjunction with climate, is the essential element through which a regions agricultural productivity can be measured; to erode land without the possibility of renewal is to take the first step in the downward spiral of desertification. Several indicators demonstrate that the arable lands in the Nile Basin are severely affected by human presence. In certain cases, poor planning is responsible for land degradation because key activities draw away nutrients that are essential to its renewal: overgrazing, intensive agriculture, and sloping grounds. Erosion is accentuated when fertile soils are impoverished, putting ever greater pressure on the life it sustains. The losses sustained grow with each cycle of degradation and, in that, are an invitation to famine. For example, a degraded surface on which the forest cover has been razed loses the capacity to retain its nutrients: rain washes through the soil, wind dries it out and disperses it more intensely, again reducing its retention capacity. Such situations are already causing landslides, damaging transport and communication infrastructures. The most harmful effect can be observed in the food insecurity created by the erosion of previously fertile lands.

The depreciation of the organic quality of soils is due to high demographic pressure and poor resource management, the corollaries of those general factors are deforestation, overgrazing and the high density of cattle, brush fires and slash and burn agriculture, as well as a lack of economic incentives to a sustainable collective use of land, all of which are part of a situation connected to the prevailing system of property ownership. Globally, the allocation of vast financial and human resources ad the establishment of solid environmental agencies capable of enforcing laws and regulations will need to become a reality to attenuate this serious problem.

1.3 Degradation of shores, rivers and lakes

The hydrological entities constitute the organs, the underlying plumbing of the great Nile river and its basin. It is the small streams, lakes and rivers from which the Nile draws its strength that make it a powerful waterway, to degrade them affects the whole quality of the basin. While the topography plays a certain role, human demography is again to blame to explain the destruction of the fragile zones that are the lakeshore and riverine ecosystems. Urban sprawl, the appeal of living close to a water source, the absence of any counter-indications or surveillance, and the poor choice of location for tourist sites are also aggravating factors. This type of degradation brings on the next point which concerns water.

1. Water degradation

Water is the sap, the very essence of the Nile Basin. It is water that gives all life. Maintaining the quality of water and the ecosystems that contribute to its purification is essential to regional stability. The major stakes in this category are the declining health of wetlands (silting and loss of buffer zones), increasing pollution (grey waters, eutrophication), and the lot of sanitary problems associated with contaminated or poor quality water (morbidity, epidemics, mortality).

2.1 Environmental health and sanitary problems.

Water being a source of life, insects and other pathogens use it to proliferate massively. Bad water quality and its consequences on human health is the problem judged as being the most severe in this category. Priority should be given to the resolution of this situation because even in the short term, it breeds death. In the chapter of diseases borne of infested waters, malaria holds a pre-eminent position: it is the main cause of death in most countries of the Nile Basin. Harmful as it is, malaria does not entirely eclipse other waterborne diseases like bilharzia (schistosomiasis), second only to malaria, diarrhea, dysentery, intestinal works, kidney disease, hepatitis and typhoid fever. Further, knowing that 10% of the sub-Saharan population is infected with HIV/AIDS, it is obvious that the infested waters of the Nile Basin are that much more of a threat to those millions of people whose immune systems are weak.

2.2 Wetlands

These flat and humid regions are the source of prodigious and abundant life. They are threatened, however, by drainage (for agricultural, industrial and settlement purposes), by filling (for roads, settlement, or solid waste disposal), by dredging, canalisation, and other hydrological alterations (for navigation, flood protection, canals, and other structures), by the abusive consumption of aquifers, the disposal of pesticides and herbicides, and sewage. The Nile Delta is the region that is most affected by this problem which nevertheless subsists is all of the Nile's wetlands. The destruction of wetlands is also significant because it signifies the disappearance of the precious service that it usually provides to human communities. These services are: (1) control of water flows, allowing for the regulation of the water level of rivers despite the important variability of rain, and inversely, (2) the absorption of too high water volume, preventing strong erosion and flooding; (3) the filtration of brown waters and sediment, as in the Mount Elgon region; (4) the purification of grey water rejected from agricultural, industrial, and domestic activities, as in the Kampala region, and at last, for the vast humid plains, (5) the regulation of climate and precipitations, as it the case for the immense Sudd.

2.3 Pollution and associated problems

The lack of adequate water treatment systems favours the presence of pollutants in the water. These come from point sources, like population centres or industries, or non-point sources, like generalized agricultural practices. In any case, the problem stems from a lack or insufficient treatment of water. At the end of the cycle, waters that will have been filled with salt, sediment, organic matter, nutrients, fecal coliforms, heavy metals, pesticides and herbicides, poison life (anaerobic water and death of fish), overfeed life (eutrophisation, waterborne disease, saturation of navigation waterways with weeds), or limit life (silting and reduction of wet ecosystems).

The other preoccupying phenomena related to water are silting (which limits the ability to navigate, alters the course of rivers and reduce the stocking capacity of reservoirs), the proliferation of invasive species of plants (like the omnipresent water hyacinth) and animals (like the Nile perch and tilapia). Other than the high human demography and poverty that, in Africa as everywhere on Earth, has a high impact on nature, the degradation of water finds its origins in the inadequacy of financial and human resources, political, judicial, and medical means, and infrastructures for the treatment and elimination of waste capable of stemming these plagues.

3. Preparation for disasters

3.1 Floods, Droughts, and Demographic Displacement

The Nile Basin is particularly vulnerable to natural disasters: on the one hand, the tropical precipitations in the centre (Rwanda, Burundi, Uganda, and Lake Victoria) and the hurricanes fuelling the monsoons of the Indian Ocean favour the sudden rise in water and flooding, on the other hand, the broad climatic variability, the negative effects of contemporary climate change, and the proximity of a desert climate threaten many reasons with drought. Floods have a considerable destructive potential: harvest, beasts, arable land, houses, infrastructures can all be damaged or devastated. Episodes of flooding entail important social costs, in addition to having considerable environmental impacts and severe economic losses.

Droughts, for their part, register more through their duration and how they affect the crucial availability of water: wells dry up, streams disappear, rain doesn't come, crops become insufficient to feed the populations. The food insecurity that droughts provoke can lead to famines or human migration which in turn start conflicts (the Darfur crisis being a good example of this) and even greater pressures on public health, biodiversity, and water. Better equipped and better prepared meteorological services, aided by global management of the Basin (looking after several problems including soil exhaustion, deforestation, uncontrolled urban development, and unsustainable water use) could mitigate the effect and reach of these natural disasters.

3.2 Climate Change.

This megaphenomenon causes the increase of the temperature of the planet and is attributed, in part, to the consumption of fossil fuel and the the anthropogenic emissions that result from it.

Locally, this is translated into the disappearance of climatic regions that have prevailed for centuries over a region and their replacement with a new climate creates new patterns in temperature, precipitation, sun exposure, etc. The speed at which this is happening is already causing lasting, and potentially catastrophic, negative impacts. The margin of error of current models is still considerable when it comes to predicting what the new climatic regimes of a region will be (ie. Nile Basin). However, the observations that are made from reality are often at the high end of the analysis, indicating how narrow the factors are that are taken into account .

The IPCC[1] report on climate change in Africa announces, with a high level of confidence, that the continent will be very severely affected by global warming, not only because of its topography and its situation on Earth, but also because of its great socioeconomic vulnerability and the limited resilience of its populations, already pushed to their limit. If current tendencies cannot be changed, it may yet be possible to undertake measures to mitigate and adapt to counter the more devastating impacts of global warming.

2. Destruction of habitats, erosion of biodiversity.

The biological diversity, or biodiversity, corresponds to the wealth of genes, species, and ecosystems that, in their association to abiotic matter, form the terrestrial biosphere – the fruit of 4 billion years of evolution. Through the destruction of habitats (ie. conversion of forests into arable lands and filling of wetlands for settlement purposes) or through their disruption (introduction of exogenous species), human disruptions greatly restrain ecosystems capacity to provide their 'services'[2]. Such interferences are spectacular in Lake Victoria where the Nile perch was introduced in 1954 and has since brought over 200 endemic species of fish to extinction.

The erosion of biodiversity is a global phenomenon. If the disappearance of species is often received with little more than a shrug, it is important to remember the central importance of cultural and aesthetic values related to the millennial presence of these organisms and the landscapes that is theirs. Further, if the drop in populations of big mammals (caused by poaching, the black market for exotic species, or the small surface of protected areas) is damaging to the tourism industry, its real measure resides in the fact that it is a tragic impoverishment of an iconic terrestrial fauna, unique and ancient to our biosphere.

The environmental problems that have been reviewed thus far are all present in this category. Among the more obvious reasons why, let us mention socioeconomic realities, uncontrolled management or the abusive use of natural resources, lack of alternative means of subsistence,

[1] Parry M.L., O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., 2007, *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* Cambridge University Press, Cambridge, UK, pp. 434-467.

[2] Les services rendus par les écosystèmes à l'humanité correspondent aux bienfaits que les sociétés obtiennent de la nature. En valeur marchande, ces services sont estimés à 33 000 000 000 US $/an en moyenne (Costanza R. et al. 'The value of the world's ecosystem services and natural capital', *Nature*, Vol. 387, 1997, pp. 253-260.).

lack of awareness, lack of political, judicial and technical means, lack of coordination in the establishment of conservation areas, important demographic shifts, and the macroeconomic contexts.

Conclusion

The Nile Basin is 30% arid. The countries it traverses have a cumulated population of 360 million inhabitants. The biological diversity of this region, vegetable as well as animal, marine and terrestrial, is unique on Earth. The climate, uncontrollable, is undergoing metamorphoses that will seriously affect the availability of the Basins' water, affecting in one fell swoop the whole of the systems present. Without trying to be overly dramatic, the training being produced will instil a sense of urgency in order to solicit today's youth to act, now and later, to promote a durable course to the operations on which human activity have a great influence within the Nile Basin.

End of the Report