

ENVIRONMENTAL MANAGEMENT OF SPORT INFRASTRUCTURE FOR SUSTAINABLE DEVELOPMENT IN BENIN: Case of the Friendship Stadium Mathieu KEREKOU (1982-2015)

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Abstract: *The object of this study is to evaluate the level of use of the tools of sustainable development in installation of sporting spaces and of leisure to Benin in particular at the stadium of the friendship Mathieu KEREKOU. The retrospective study, of analytical type describes in a qualitative and quantitative way the interaction between the actors of system the substructures, green spaces. The study tries moreover to determinate the level of use of instruments of development in the construction and the management of the stadium of the friendship and the impact on the athletic performances.*

Our analyses integrate the geographical system the approach of the sport for a sustainable development, and the system of audit which compares the economic, social and environment practices of the stage with the standards in force. On the whole, 280 practitioners were questioned. The results reveal that 85 % of the sporting of the sportsmen of weekend light it not satisfaction of the toilets and showers on their passage, 75% of the regular sportsmen are constrained to breathe of the bad smells during their practice, 75% of the archers stated to have been victim of auditive nuisances, the athletes of the green lawn declared that the access door is often closed because of no sportive activities. Four (4) shops out of the 200 accounted for 2% of explosion of fire hazard for this stadium. These data indicates inexistence of an instrument of sustainable Development in this stadium. A more responsible control compared to the ecological standards must be recommended.

Key Words: *Environment, sporting substructures, control, sustainable development, Cotonou*

1. INTRODUCTION:

The contemporary world is increasingly challenged by environmental problems related to urbanization, industrialization, economic development, population growth and changing lifestyles (Gbinlo, 2010). All human activity has effects on the natural environment; sport is no exception, neither for recreational sport nor for competitive sport (Kasper, 2007). Thus, large-scale events (Olympic Games or world championships) that take place in different countries, certainly act on their economic and environmental social development. The Environmental Performance Report of Major Events of the United Nations Environment Program (UNEP) shows that 2.73 million tons of greenhouse gases were emitted at the 2014 Brazil World Cup, the equivalent of six months of energy consumption in Iceland. This report noted that compared to the 2010 World South Africa, Brazil could do better (UNEP, 2015).

The population explosion is accelerating urbanization with its corollary of negative consequences for the environment (Borokini, 2011). These effects are more pronounced when urban development is unplanned, as is happening in developing countries. Due to the overexploitation of the second largest forest basin in the world (after that of the Amazonian forest) by foreign firms, the Congo Basin is subjected to excessive deforestation. The consequences of this human action on nature translate into intense ecological damage with a decrease in biodiversity and a long-term loss of financial resources (Abalot, 2011).

This phenomenon is also approaching the occupation and functionality of urban sports spaces in general and the Kouhounou friendship stadium, which has become a stage of the Mathieu KEREKOU friendship in particular. Indeed (Dan & d'Almeida 2014), affirmed that it is the multifunctionality of the football pitch of the Friendship stadium which is its own evil and that, the suitable number of public planned to occupy it increases considerably (50,000 people instead of 35,000) during major events, which raises the issue of environmental management in the context of this study. Excluding, since the Rio declaration (1992) on the environment and sustainable development, researchers in Social Science, (Callède and Abalot, 2014), (Tente, 2013), (Augustine, 2011), reports of the International Olympic Committee, (IOC, 2007) root their work in the fields of investigation of the greening of sports practices or in a "green" sport, respectful of the environment.

In Francophone Africa, several actions in favor of the protection of the environment are also carried out through colloquia, seminars, conventions and IOC guide to reconcile sport and the environment. In Benin, the Beninese Environment Agency has designed a general guide for carrying out an Environmental Impact Assessment in February 2001 of projects in Benin and sectorial guides specific to certain types of projects: agriculture, forestry, protected areas, water supply, oil, electrification, gas pipelines, installation of industries, tourism development ... etc but nothing is planned in this direction for the construction projects of sports and cultural infrastructures. The methodology applied to sustainable development (CIO, 2007), requires the required use upstream and downstream of the construction of infrastructures as instruments of objective measurement of development. The management of our sports facilities must be made from the perspective of sustainable development, which has a particular connotation when physical activities must be respectful of the environment (Callède, 2014).

In West Africa, most stadiums have been built by nation-states since independence with the help of cooperation, particularly that of the People's China, which has delivered six. These stadiums of 40,000 to 60,000 places were built in Cotonou, Mogadishu, Ouagadougou, Banjul, Rabat and Dakar (Sall, 1986). The question of the integration of environmental instruments for Sustainable Development in the sports and leisure sector arises in Benin.

This study addresses two research questions:

- what type of environmental management is adopted in the stage of the general friendship Mathieu KEREKOU?
- what are the beneficiaries' interactions with sports infrastructure?

To carry out the investigations, the hypothesis of this work admits that "a balanced environmental management of the sports facilities can improve the conditions of sports and leisure activities of the beneficiaries". Therefore, the study aims to assess the diversity of economic and social activities and the environmental management of the stadium in order to compare them with the norms of the framework environmental law in Benin. To achieve this goal, the use of a methodological approach to environmental audit has allowed collecting and analyzing data in order to develop a Social and Environmental Management Plan (SEMP) for this purpose at the stadium. The behaviors of the beneficiaries were compared to the norms and requirements through the relevant decrees and articles of the law.

1.1 The study site and methodological approach

Geographical, Political and Socio-Economic Description of the Framework

The commune of Cotonou is located on the coastline stretching between Lake Nokoué and the Atlantic Ocean. It is the only commune in Littoral Department and is bounded on the north by the commune of Sô-Ava and Lake Nokoué, on the South by Atlantic Ocean, on the East by the commune of Sèmè-Podji and on the West by the one of Abomey-Calavi. It covers an area of 79 km², 70% of which is located in west of the channel. Eastern neighborhoods are connected to the west by three bridges (CRSSD, 2013). The city of Cotonou is subdivided into 13 districts, and the districts into quarters. The borough has no legal personality or financial autonomy, in accordance with Article 34 of Law No. 97-228 of 15 January 1999 on the organization of territorial administration in the Republic of Benin.

The stage of the general friendship Mathieu KEREKOU is located in the 9th district of the Commune of Cotonou more precisely in Zogbo (figure 1). A sports complex, a \$10 million achievement that spans thirty-one (31) hectares (Dan R & d'Almeida V., 2014). This figure presents the cartography of the 9th arrondissement where Zogbo is located the district which houses the stadium. Zogbo lies to the south between Minen and Fifadji. Note the present Lake Nokoué, a body of water flowing wastewater fake, the pool water and sewage stadium. This study framework requires the characteristics of ecosystems more or less modified by man, a local perimeter but also global as hosts during major events 35,000 to 50,000 people (Dan & d'Almeida, 2014).

On the environmental front, the city of Cotonou enjoys a tropical climate, with two rainy seasons (April-July and September-October, 800 to 1200 mm of water per year) which alternate with two dry seasons. From December to January, the harmattan blows. The temperature oscillates between 18 and 35 ° C. (DPDM, 2008). According to the general results of 2004 on environmental nuisances, noise pollution is in order, the fourth problem after sewage, garbage and lane congestion. The risks faced by the people of Cotonou are diverse:

- bronchitis in motorcycle taxis, as well as a risk of developing various cancers in the long term;
- bacteriological risks related to the unsanitary nature of the market gardening sites; flood risk (Houndagba, 2001).

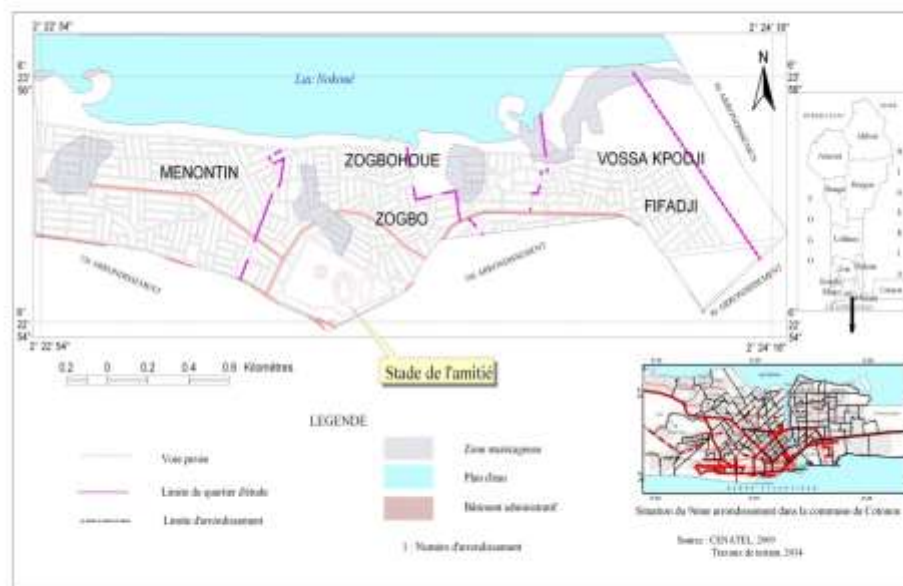


Figure 1: Location of the Friendship Stadium
Source: Stadium Mapping (August, 2014)



1.2 Methodological approach

Data Collection and Processing

This retrospective study of analytical invoice describes in a quantitative and qualitative way the management mode of the stage of the friendship General Mathieu KEREKOU from the point of view of a sport respectful of the environment. It studies the level of use of environmental sustainability tools in the sports sector based on the method of geography through mapping and auditing. To remain in conformity with the multidisciplinary spirit of Sciences and Techniques of Physical and Sports Activities (STAPS), a consultation of the Documentation Centers of the Benin Environmental Agency (BEA), the Documentation Center of the Ministry of Environment of Habitat and Urbanism (MEHU), and the Ministry of Youth and Sports (MJS), available focusing on disciplines close to and / or related to sociology such as: structural anthropology, ethnology, management sciences, the environment as well as political, economic and management sciences among others was conducted among users of the stadium and other residents.

Thus, a number of stakeholders in the field and the local population of the study was selected to gather their implications and testimonies in the management of the largest sports infrastructure in Cotonou. This is the random choice mode with discount that was adopted for the first two categories of subjects surveyed at a rate of 2%; school and civilian competition athletes (43), and other users (40). The non-probabilistic method and the exhaustive technique were used for the last three categories of actors (stadium managers, Federation Presidents (6), stadium managers (3), ZOGBO district elders (2); former and current staff of the EBA (05); because these people are determined in advance, so are known before the survey and the survey method for the first categories (Saturday and Sunday Maintenance Workers (181). The sample is composed in total of two hundred and four Twenty (280) sports actors following the interview

technique, followed by questionnaires. The geographical map and satellite photos of the city have allowed direct observation of the deteriorating facts of the sports environment with a view to a sustainable perspective.

Quantitative analysis is relied on statistical processing by Excel. The coding of the information collected was done manually based on tables. The audit method provided a directory of internal and external shops and restaurants located around the stadium.

After listing shops and restaurants located in the compound, as well as outside the stadium, we characterized them according to their nature, the activities that take place and their nuisances. As for the recordings, they were first transcribed before being analyzed.

The discussion of the collected data was done in relation to the rules and requirements of the IOC, to the national legislation in force through the appropriate decrees (environment, hygiene, health, safety, technical standards, good practices) and the Agenda 21 of the IOC (Table 1) which set the limits to be respected. These criteria made it possible to deduce the current trends to follow for the effectiveness of the actions undertaken and to identify possible dysfunctions / deficiencies.

2. RESULTS:

2.1. The existence of environmental conformity of the stadium

The study was conducted on the sports infrastructure of the General Mathieu KEREKOU friendship stadium in general and on sports facilities in particular. It is first retrospective because it sought to have the building permits issued by the EBA in terms of Environmental Certificate of Conformity (ECC) an official document which must appear in the administration of the stadium according to the standards after the conducting environmental impact studies of projects over the last 20 years including.

The documentary searches of the EBA, and the questionnaires sent (8) to five (5) EBA authorities and three (3) of the stadium in charge of environmental management and stadium security have showed that 66.66% that on all the impact studies carried out none concerns the construction projects of the sports infrastructures.

Stadium authorities representing 33.33% say that an environmental management plan exists at the stadium by presenting a monthly activity planning sheet on the green lawn. Environmental management is reduced to the management of the green lawn which consists of regular watering and maintenance of the race track and especially the rental of spaces, accommodations, lawn, and stadium shops. It should be noted that tenants manage their shops as they can. This form of management is not balanced but fair as shown in the diagram in Figure 2 below. However, when an infrastructure is carried out during operation without an environmental impact study at the outset, for good management and to comply with the law, periodic audits must be carried out (André, 2011).



Figure 2 : Diagram of Sustainable Development
Source: CRSSD, (2013)

The study is also analytical because it describes in a qualitative and quantitative way the interaction between the actors of the system, the infrastructures, and the green spaces. The results are also reflected in the behavior of the beneficiaries vis-à-vis the sports facilities through the sanitation of the stadium, the diversity of the internal and external activities of the stadium and the nuisances.

The audit method gathered information about the natural environment of the study framework from neighborhood elders. Thus, the local perimeter of the study included, before the construction of this infrastructure, a flora consisting essentially of plant species such as: *Cocosnuciferat* (coconut palms), *Mangiferaindica* (mango trees), *Azadirachtaindica* (the nimes), *lcacinatrichanta* (lianas), etc. which were destroyed. The fauna consisted of Aulacodes, partridges, rats, mice, birds, snakes, termites, bats, etc.

2.2. Odor and waste management in the Mathieu KERKOU stadium

Figure 3 shows the appreciation of odors by the beneficiaries during sports practice.

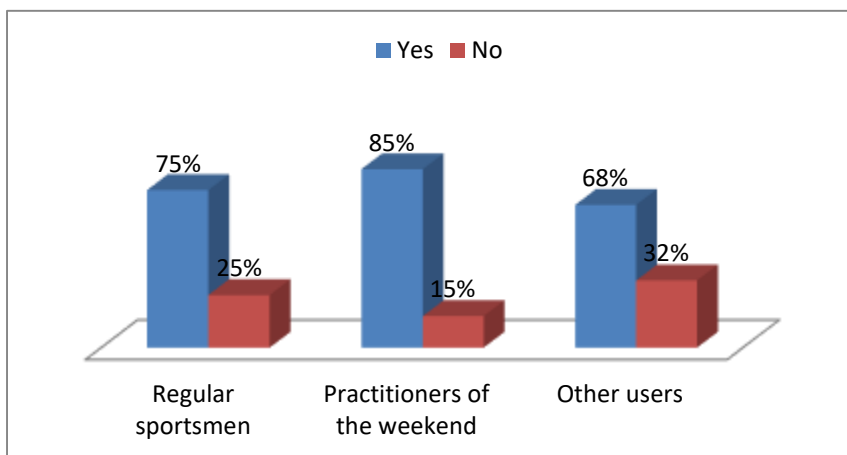


Figure 3 : Assessment of odor pollution level (n = 264)

In terms of odor, the assessment varies according to the zones, the moment and according to the location of a user to another. 85% versus 15% of weekend sportsmen said that stadium users urinate everywhere and that the places smell of urine and smell of kitchens (sometimes pleasant and sometimes unpleasant). Regular athletes (75% vs. 25%) have argued that at the stadium there are bad smells. They also said that the bottom of the stairs of the Sports Hall is turned into a toilet for lack of urinals and latrines.

Board 1 clearly shows the condition of poorly maintained mobile urinals (toilets), which is another source of foul odor on the stadium. It should also be noted that the lack of toilets pushes some users of the stadium above all, those from outside the hotel to do their needs in nature sometimes in the immediate environment of the play areas; source of foul smells (Board 1).



Board 1: Public toilets of the stadium
Source: direct observation in the field (2015)

They said that household wastewater discharges, household kitchen waste from restaurants, poorly managed waste, all this added to installed mobile toilets that are not emptied in time (see Board 1). The number of bins (7) denotes their lack especially the ground, so the bags and candy wrappers are thrown everywhere by users. The results show that, Decree No. 98-030 of 12 February 1999 on a framework law on the environment in the Republic of Benin prohibiting any kind of nuisance related to odors, is not respected in this stage. Decree No. 2003-332 of 27 August 2003 on the management of solid waste in the Republic of Benin, Law No. 87-015 of 21-9-1987 on the code of public health are therefore not respected in this stage.

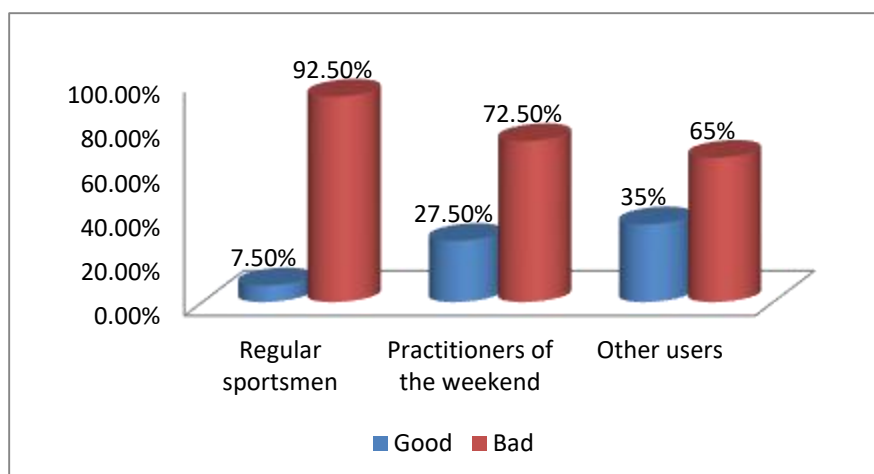


Figure 4: Degree of satisfaction of the needs of competition athletes in waste management (n = 264)

The analysis in Figure 4 shows that 92.5% vs. 7.5% of competitive athletes find that there is poor waste management (garbage and bags) at the stadium. For weekend practitioners, 72.5% vs. 27.5% said the waste is poorly managed. As for other users, 35% versus 65% found that there is mismanagement. All respondents say they lack trash, which forces them to throw the bags everywhere.

2.3 Hearing nuisance

Hearing nuisance varies with time, space and user category. During the surveys, the noise was appreciated differently by the users of the stadium. 75% of the archers turned green during the survey period for the TIZOCATA declared that their rest was disturbed (between 12 pm and 3 pm) by the music from shops and bars restaurants on the one hand by screams and prayer sessions organized (between 18h-24h) for several days on the esplanade of the stadium (on the side of the hotel) on the other hand.

For hotel guests, the noise varies depending on the position and the standard of the room. Similarly, 85% of weekend sportsmen recognized that there is noise at the stadium level; but for 32%, there is no noise. For weekend sports, noise varies with time. Very early in the morning from 7 am to 8 pm, there is no noise. But from 9 o'clock the noise settles.

In their rank, 80% recognized that there is noise at the stadium level against 20% who find that there is no noise.

2.4 Traffic and access to the stadium

No permanent traffic plan exists, except during periods of shows where the space is under rent. On Saturdays and Sundays, the circulation of motorcycles and cars is prohibited between seven (7) hours and (10) hours from May 2015 on the internal esplanade where the maintenance sports are held. It should also be noted that after a rain, the ground deteriorates and makes traffic difficult in places as shown in photo 2 representing the access to the archery grounds on the Taekwondo dojos. This lane leaving the main gate leads to the Benin National Olympic Sports Committee and on the archery field.



Picture 2 : Track condition in the stadium enclosure after a rain

Source: Direct observation in the field (2015).

2.5. Hygiene changing rooms, toilets

The law defines the general prohibition of acts detrimental to the maintenance of a healthy environment. Observation of the study framework shows that the environment is not very clean (Pictures 3, 4 and 5). This lack of sanitation is blatant in some toilets used by competitive athletes during their stadium accommodations for the green-up period.



Picture 3: Toilet of the accommodations Picture 4: Toilet of the Olympic pool of the stadium Picture 5: Public toilet closed

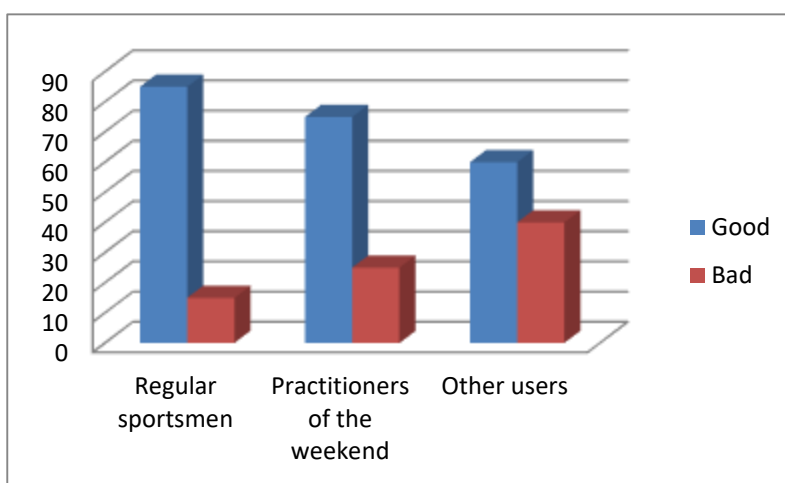


Figure 5: Degree of satisfaction of the needs of competitive athletes (n = 264)

The analysis of this graph reveals that 75% of athletes coming to the stadium on Saturdays and Sundays are happy to do their maintenance sports at the stadium against 25% who say they come in spite of themselves.

2.5 Difficulties of the sportsmen of Saturday-Sunday

The figure below shows the level of satisfaction of Saturday-Sunday sportsmen (n = 181). Some looking for fitness and others looking for performance.



Figure 6: Meeting the needs of athletes from Saturday - Sunday (n = 181)

This figure shows that 72.5% of Saturday-Sunday sportsmen are happy with the friendly and fraternal atmosphere prevailing in their play area. This same proportion of these athletes claims to be dissatisfied with the quality

of the provision of the health needs of the office (health, hygiene) in the field. 47.5% of these sportsmen say that the space is not enough for them but that they are obliged to do with it. In sports equipment and sports facilities, 65% of athletes on Saturday and Sunday are satisfied with the quality of infrastructure (sports facilities), against 35% say the opposite.

2.6. Some behaviors of competitive athletes not respectful of the environment

All competitive athletes (46) believe that their sport does not have a negative impact on the environment but that it is their unsanitary behavior (production of waste on the ground spitting and urinating anywhere) that degrades the environment. Similarly, the oils of restaurant kitchens that volatilize are often deposited on the surface of the pool water, which leads the maintenance staff of this pool to a permanent cleaning of the pool tiles with water from bleach and acid.

The working conditions of athletes are not often pleasant. All facilities and particularly the green lawn is affected by the throes of the business in this sports center par excellence. The athletes surveyed and their coaches (9) representing the 20.5% of the competition athletes who trained on this field all declared that the gateway to their field is often closed to athletes because of non-sporting shows (political meeting, music, etc.).

Sports equipment is poorly managed. Beninese athletes are obliged to move each time certain sensitive materials after their use. The repeated movements of these equipments (high jumping foams, pole vaulting board) facilitate their deterioration very quickly, thus reducing their life span; resulting in a decline in performance.

2.7. Categorization of non sports activities and their nuisances at the stadium

The audit of the activities identified at the stadium revealed that the administration of the stadium, while focusing on the social and the economic, has a lot to invest in the ecological to respond to sustainable development. The table below shows the diversity of the internal commercial activities and which are carried out mainly during the day (between 7am and 6pm) in the shops (200) around which surround the stadium, these activities are distributed according to their category and their nuisances. According to the chief secretary of the stadium in service, there is a decree authorizing the rental of stadium spaces to the public. The analysis of this table shows that 78 or 39% of shops were occupied for bars and restaurants, 36 stores or 19% are devoted to the sale of phytosanitary products. Outlets for gas and gas, adulterated gasoline and gas oil occupied four (10) shops, which represents 7.5% nuisance in terms of fire risk.

Table 1: Directory of store activities surrounding the stadium

Activities of shops	Nuisance	Percentage (%)	Total (200)
Petroleum products, cosmetics, gas, garage, etc.	Risks of fire, pollution, Noise, conflicts	7,5	10
Health products	Noise, conflicts	19	36
Divers sales shop	Waste	10	16
Computer materials	Waves, noise, conflicts	12,5	25
Restaurant and refreshments	Odors, waste, pollution, conflict	39	78
Ready to wear	Waste, Conflict	7	14
Shop for rent	Empty	9	18
Sports equipment	Noise, Waste	1,5	3

Source: Direct observation of shops surrounding the stadium, 2014-2015

3.CONCLUSION:

This study allowed us to understand that the hygiene and sanitation of the locker rooms and accommodation of stadium users; auditory nuisance and odors; poor waste management; pollution of the pool water poses enormous difficulties to the beneficiaries. The study has allowed us to understand that Benin's adherence to the objectives of sustainable development has led, since 1990, to: the creation of a Ministry in charge of environment and Beninese Agency for the environment; the development and adoption of an Environmental Action Plan (EAP) and a National Agenda 21; the drafting and voting by the National Assembly of a framework law on the environment. Article 27 of the

Constitution of 11 December 1990 places the environment at the level of the fundamental rights of the human person and requires the State to ensure its protection. Article 3 of the Environmental Framework Act defines six (06) main principles that now govern the management of the environment in Benin. Points b-c provide that: every citizen has the right to a healthy, satisfying and sustainable environment and the duty to defend it; and to prevent and anticipate actions likely to have immediate or future effects on the quality of the environment. Despite all these provisions and principles of this law, the management of the largest sports and leisure stadium in Cotonou of the general friendship Mathieu KEREKOU needs a capacity building. Our assumption that a "balanced environmental management of sports infrastructure can improve the conditions of sport and recreation of beneficiaries" is verified. What is the infrastructural policy governing the creation and management of sports infrastructure in Benin? If the Environmental Impact Assessment according to (Michel, 2001) aimed at providing a solid basis for the management of consequences on management actions, promotes the integration of the fundamental objectives of environmental protection and the protection of the environment. sustainable development, this seems to us a wise choice in STAPS and the ministry in charge of sports and leisure.

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