Climate Change and Integrated Coastal Management: Risk Perception and Vulnerability in the Luanda Municipality (Angola)

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Abstract Climate change has imposed significant changes in the structure and natural dynamics of coastal ecosystems, compromising their resilience capabilities. The socio-environmental vulnerability in many coastal areas is aggravated by the inadequate articulation of an integrated territorial management and policies and plans to adapt to climate change. This work was carried out in the municipality of Luanda where erosion, floods and mass movements are an increasingly worrying reality. The research methodology for this study was based on questionnaire surveys and semi-structured interviews, with a focus on qualitative aspects, applied to policy makers, population and NGOs. The results indicate a lack of active participation of citizens, training and taking initiatives in environmental policies and integrated management of the coastal zone, and a lack of environmental information and integrated coordination of institutions with environmental responsibility.

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Introduction

Strategies for adaptation to climate change are today considered as a general instrument intrinsic to the development process. Angola is a country whose economy is largely dependent on climate and with more than 30% of its territory under climatic risk. Excessive anthropogenic pressures in coastal zones (CZ) contrast with the strategies of integrated management and use per the criteria of the sustainability ethic. Thereby constituting spaces with greater potential for risks and conflicts. Coastal erosion, uncontrolled occupation, and pollution are a reality whose impacts pervade life, local economies and different coastal and marine ecosystems. The absence of a culture based on the precautionary principle, and the inability to take the socio-environmental risk posed by climate change as a decision-making tool and vigilance in public policy, has given rise to the growing threat to the integrity and ecological and environmental balance in many CZ.

Despite the antiquity of human presence in some coastal areas (CA), dynamics and the complexity of their ecosystems continue to surprise (namely resilience). Disorganized constructions on drainage lines or on steeply sloped areas have imposed significant transformations on the biological or chemical properties and the natural landscape of ecosystems with consequences for the life and patrimony of Humanity. Conflicts and struggles for spaces are a reality, with greater expression, in CA whose ecosystems today have high anthropogenic pressures. Coastal areas mischaracterization processes increasingly disturb the dynamics and natural evolution of their ecosystems.

The scarcity of certain coastal resources is increasingly worrying, having imposed not only some limitations or vulnerabilities, but also the retreat of the regeneration capacity of these spaces. The destruction of the vegetation cover of many coastal space clippings is followed by an illiteracy that is somewhat generalized about the amount of water entering and being lost through evapotranspiration and evaporation in the country, which is essential to know such as the Water balance or the yield of the basins in the coastal areas.

This work intends to deepen the knowledge about the coastal zones in the light of the socio-environmental risks and vulnerabilities arising from Climate change (CC) in the municipality of Luanda (Angola) with a focus on local adaptation based on the identification of local risk conditions and vulnerabilities.

Study Area

Location of the Municipality of Luanda

Luanda is one of the municipalities of the capital of the Republic of Angola in Southern Africa. The municipality is bordered by the Atlantic Ocean and has an area of 113 km^2 according to Law no. 29/11 of 1 September and of Decrees no.

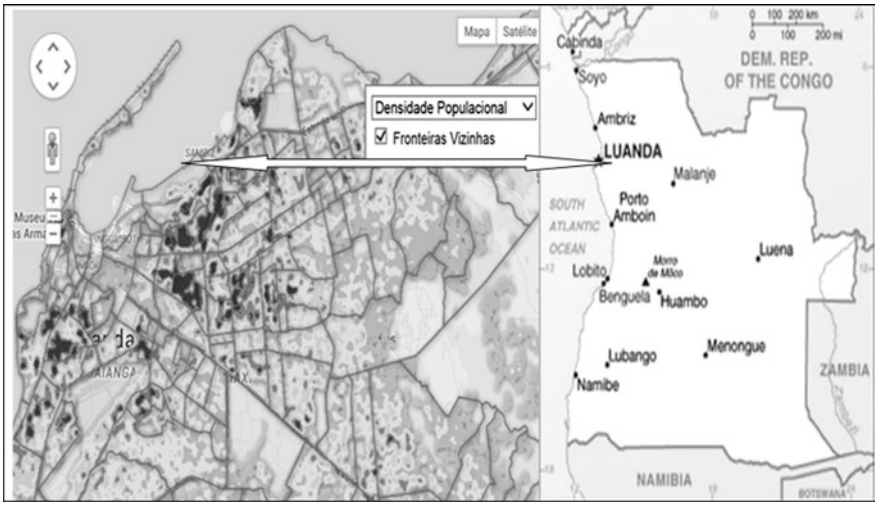

Fig. 1 Luanda Municipality

277/11 and 47/12 which defines the New Political Division and Administrative Organization of Luanda. It lies in the region corresponding to the parallels 8°49′13″ of South Latitude and 13°13′09″ of Longitude East. The figure shows the geographic context of the municipality Fig. 1.

Climate

The climate of Luanda is characterized by two seasons: one hotter and wetter and one colder and drier. The climate is tropical humid, but dry due to the cold current of Benguela marked by a weak rainfall with average of 323 mm annual, irregularly, distributed and, with a coefficient of variation, between the highest of the world (about 40%). The trade winds are constant with average speed between the West and Southwest directions (Trindade 2000). Regarding precipitation according to Lotz-Sisitka and Urquhar (2014) and Urquhart et al. (2014), the information in Angola is not entirely reliable considering that only 20 rainfall stations are in operation. Between 1970 and 2004 there was an increase in surface temperature in Angola between 0.2 °C and 1.0 °C in the coastal zones and North. The rate of air temperature increase in Luanda is 0.2 °C per decade, accumulating between 1.911 and 2005, a total of 1.9 °C (Lotz-Sisitka and Urquhar 2014). From a historical point of view, the constructions in Luanda were made in the margin of the foundations and norms of planning and territorial planning. According to Correia (2012), the colonial installation in Luanda presided high for strategic military reasons with the first plant in Luanda dating to 1621, almost half a century after the founding of the

city of Luanda in 1576. The lack of articulation of integrated policies based on the precautionary principle is associated with the increasing population density; poverty and lack of basic social infrastructure; spatial segregation and low levels of environmental awareness and capacity building; the lack of information and participation of the population in training and decision-making processes; the absence of territorial zonation based on the identification, monitoring and prevention of the risks accentuated the disorganized settlements imposing physical alterations in the coastal territory of Luanda.

In the port of Luanda heavy engineering works and other inappropriate uses of the coastal soils without integrated planning of the territory have altered deeply the natural landscape of the Bay of Luanda in recent years. Since there is no monitoring of coastal erosion or data on historical erosion rates in Luanda, the Planning of the Coastal Zone of Luanda and eventual adaptation scenarios for erosion may be compromised in some aspects. One of the observable aspects has been the early intervention in some coastal stretches without being known through multidisciplinary studies of the natural evolution of the coastline.

Flood Characterization in Luanda Floods are a hydrological phenomenon resulting from a set of natural or entropic factors that are defined as the partial or total submersion of an area per rule immersed by trans-shipment or accumulation of water (Garcia 2013). In Luanda, floods have the following characteristics:

(a) rapid floods with short rains due to the geological structure of reduced permeability in some areas that makes it difficult to infiltrate water by increasing the flow of surface runoff
(b) marine floods generated by the combined action of a meteorological storm and tide, locally called Calemas or "higher waves" that have caused coastline gouges in some areas
(c) flooding by rising of the water table after rainy days in some areas.

The main entropic factors observed that introduced changes in the hydrological cycle are

(a) destruction or replacement of the vegetation cover that increases the surface runoff as it reduces the evapotranspiration
(b) construction on or at the drainage lines
(c) lack of cleaning of the river channels; inadequate drainage and disposal of sewage and sanitation infrastructure.

According to Cain (2014), the floods caused by the sub-basins of the Cambamba, Mulenvos/Seco and Cambolombo rivers pose the greatest risk.

Methodology

From the methodological point of view, three questionnaires were used for application to three different sample components: (a) population; (b) NGOs and (c) policy makers. The overall objective of this survey of the three sample

components was to understand risk perception and knowledge about the management of the coastal zone of Luanda by surveying perceptions of the population, identifying and describing socio-environmental capacities, risks and vulnerabilities. CC proposing local adaptation and resilience scenarios encompassing the key actors. In the sample component 'Population', the questions relating to the profile of the respondent, perceptions about Climate Changes, local knowledge, attitudes and capacities were essentially established. This component had a sample of 200 individuals for each 6 urban districts of Luanda (a total of 1200 individuals). The ages were distributed as follows: from 18 to 25; 26–35; 36–45; 46–55, and over 56 years without class or gender discrimination.

The survey was launched in the last fortnight of November 2012 with variations for the different urban districts of Luanda according to the authorizations to the petitions made. For this component, the interviews occurred in places of greater population concentration from the informal markets in the outlying districts of the city of Luanda to the formal commercial centers in the city, schools and residences through the interception of passers-by and, in other cases, by prior notification with the Help of the heads of the Residents' Commission. Considering the high illiteracy rate in Angola and the novelty of the subjects on environmental issues, the interviewers sought, in some cases, to translate certain concepts into the language closest to local experiences and knowledge.

For the 'Political Decisions' component of the sample, the key issues were related to institutional capacities, political, legal and scientific tools produced in the light of local sustainable development, issues of land management processes and citizen participation In training and decision-making, and finally, questions about the state of health infrastructure and environmental and public health. The general objective of the survey was to understand the extent to which local public policies influence the emergence of socio-environmental risks and vulnerabilities in Luanda.

Interviews were prearranged and conducted at the interviewee's service sites. In some cases, the interviews were done by email, skype and telephone. Fifteen public institutions were surveyed, of which five are ministries and other national, municipal and communal and urban district directions. For the evaluation of the public policies the following indicators were considered: the pertinence, the opportunity, the effectiveness/efficiency and the impacts. For the 'NGO' component of the sample, it was intended to understand the degree of involvement of civil society in environmental issues, dialogue and closeness between citizens and state institutions and to understand how local policies are assessed by civil society. This component of the survey had four NGOs. These interviews were arranged and took place in service places. The research was developed in accordance with the qualitative foundations; the techniques used were the documentary research through bibliographical consultations and the direct observation that was translated in the contact with the key informants. The participants included members of the Committees of Residents for the six districts of the Municipality of Luanda, Political decision makers such as the Municipal Administrations and directors of various public and private institutions. Ethical aspects were observed such as voluntary participation, consent and confidentiality throughout the process for both the interviews and the questionnaire.

Finally, after collection, the data and all information were subjected to a classification, analysis, treatment and discussion of results.

Results and Discussion

According to DOING BUSINESS (2012) Angola occupies the lowest place in Sub-Saharan Africa with position 178° in the item referring to "employed worker". This is despite having implemented the Strategy First Job law and public policies to promote employment, social security and having ratified the ILO's eight fundamental Conventions.

Knowledge of diseases caused by water contamination are represented in Fig. 2, and it was verified that 67% of 200 interviewees in areas of higher risk are aware of the viral and bacterial origin of diseases caused by contamination of water bodies, while 33% do not know.

Despite the high level of knowledge of diseases caused by contamination of water bodies, CEI/UC (2013) states that the epidemiological picture of Angola in 2013 continued unchanged with the leadership of malaria as the most reported disease with 56%; Acute respiratory diseases (21%), acute diarrhoea with 9%, typhoid 5%, dysentery 4%. According to OPSA and ADRA (2014), health expenditure decreased by 1.3% points from 5.6% of total expenditure in 2013 to only 4.3% in 2014. For the first-time Dengue cases numbered 1241, with the registration of 11 deaths MINSA (2013).

The Ministry of Planning cited by Oliveira (2012) states that malaria is the leading cause of mortality and morbidity in Angola accounting for 35% of the

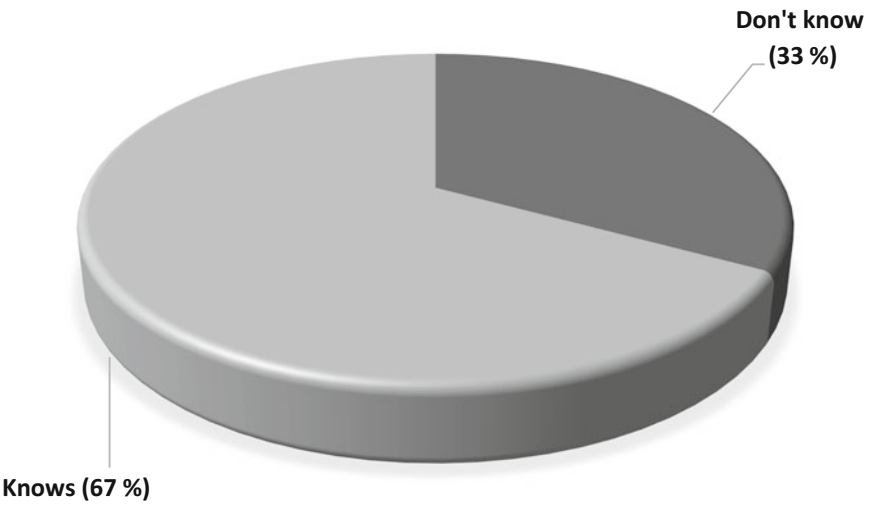

Fig. 2 Knowledge of waterborne/waterborne diseases (n = 1200)

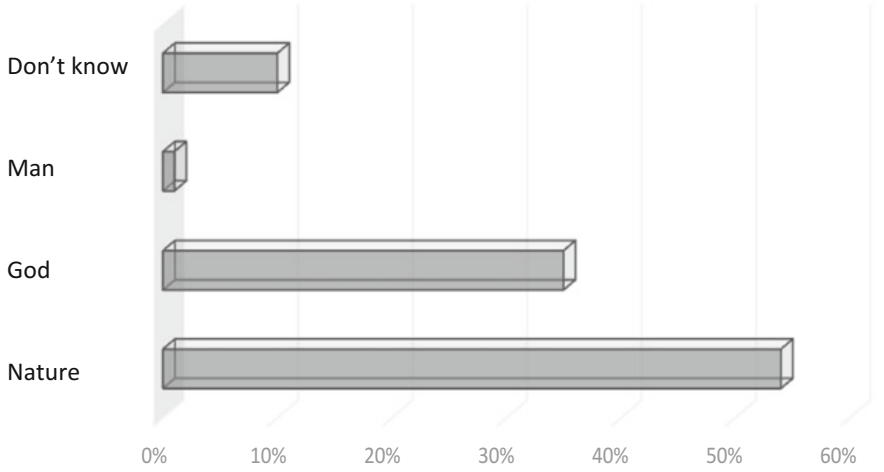

Fig. 3 Events of climate change (n = 1200)

Table 1 Estimated level of ignorance on the effects of the climate changes (values in percentage)

Urban Districts of Luanda	
Maianga	49%
Rangel	39%
Kilamba	36%
Samba	34%
Sambizanga and Ingombota	33%

demand for curative care, 20% for hospital admissions, 40% for prenatal deaths and 25% for postnatal cases. The responses from a sample of 1200 respondents are summarized in Fig. 3.

The debate about Climate Changes in Luanda and in the country in general, is still not a social reality. In public or private information spaces, there are scientific productions and publications on CC. According to Angola's Initial Communication to the United Nations Framework Convention on Climate Change, Angola has a well-established record of warming. Surface temperatures increased between 0.2 °C and 1.0 °C in the 1970 and 2004 at the coastal zones and Northern regions with a range between 1.0 °C and 2.0 °C in the Center and East. The air temperature in Luanda shows a growth rate of 0.2 °C per decade, resulting in a cumulative total of 1.9 °C between 1911 and 2005, and higher increases in the cold season (Lotz-Sisitka and Urquhar 2014).

The high level of ignorance on the effects of the Climate Changes, valued at around 72%, reflects the degree of peripherization of environmental issues in everyday considerations and achievements. In the joint analysis of variables, (a) inability to respond, and (b) exposure to risks and climatic events, the results are distributed in order of vulnerability, high, medium or low according to the following data for the various districts of Luanda (Table 1).

Table 2 Types of hazards and responses to these events for each Luanda Urban District

Luanda Urban District	Landslides (%)	Exposure to risk (%)	Floods (%)	Inability to respond (%)
Ingombota	9	11	28	22
Maianga	17	22	21	27
Kilamba-Kiaxi	17	13	13	23
Rangel	16	18	31	21
Sambizanga	10	11	28	22

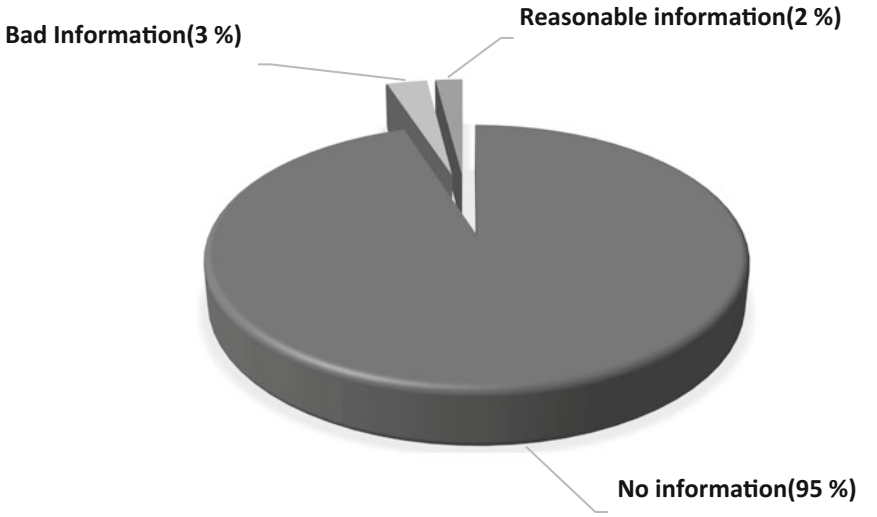

Fig. 4 Adaptation to climate change perceptions (n = 1200)

The different types of hazards and responses to these events by each Luanda Urban District in a sample of 1200 respondents are presented in Table 2.

Figure 4 shows the degree of information on Adaptation to climate change with 95% of 1200 respondents indicating they did not have information, while 3% pointed to very poor information. Only 2% indicated reasonable information about CC Adaptation.

The context of adaptation in Angola is marked by a high degree of scarcity of data and historical or scientific information (where and when). Uncertainties about the projections and the lack of real identification of local capacities or vulnerability are a reality, especially in the agricultural sector.

Adaptation measures essentially require two approaches. Firstly, analysis of risks and vulnerabilities conducted by government offices and secondly, it should be taken into consideration the soil-climatic conditions and practices in land use and occupation, especially those of a traditional nature which can also increase the risks of climate change. The following elements should be included in the structure.

(a) The principle "No Regrets", especially in situations of need and uncertainty, it is a vigilant measure that must embody and influence the whole process of policy planning. The No Regrets principle is regarded as a risk-benefit measure irrespective of whether or not projected extreme weather events occur. The institutional framework for natural disaster risk management in the country is largely monopolized and focused on public accountability. It is based, above all, on reactive adaptation and the margin of integrated readings and systemic understanding of a given territory. This prevents the measurement of the different impacts at national level and the optimization of resources. Therefore, insertion into current adaptation policies of "No Regrets" measures can help to minimize efforts that in a reactive adaptation situation would be burdensome and costly;
(b) The second policy option in adaptation to climate change for the agriculture sector in Angola is the iterative management of risk. It is not enough to plan or integrate the climate focus into policy or policy instruments. As risk and sensitivity or vulnerability factors are associated with the different trajectories and development contexts of the most diverse systems in the country, it is important to adopt permanent evaluation tools. Interactive management is an important measure in adaptation, because it accepts planning not just as a single moment and secondly because it evaluates, permanently, the indicators of verification of ab initio results. Iterative risk management offers methods to deal with uncertainties through a continuous process of evaluation, action, re-evaluation and response. (OCDE 2011) presents the network of interactions, the core of which comprises five stages of climate change adaptation planning: the design and identification of baseline planning elements; assessment of current risks and vulnerabilities; assessment of future risks and vulnerabilities; formulation of the adaptation strategy and continuous adaptation process;
(c) The third axis is the dialogue between modern and traditional epistemologies. In adaptation, it is important to articulate different experiences, practices and knowledge, especially with epistemological dialogues that structure and reinforce each other for resilience. The different policy and regulatory instruments relating to the agriculture and environment sector consulted show a high deficit of dialogue and articulation with traditional knowledge. Adaptation to climate change has its framework for building effectiveness, primarily from the location informed by specific behaviors and knowledge. The lack of local historical capital, could compromise strategies to deal with historical climate variability, in a country without territorial coverage of meteorological information instruments or historical databases, to the ways of conserving seeds or to read seasonal calendars and knowledge of consumption habits or crops and their tolerances may lead to bad adaptation;
(d) The fourth policy option in adaptation is consistency. For OCDE (2011) the articulation and interconnectivity of both political and normative instruments in adaptation is fundamental. It is important that, from the point of view of horizontal coherence, it is ensured that the individual and policy objectives of different local actors are mutually reinforcing. This requires not only the

construction of objectives and the definition of goals to be achieved, but also the coherence of practices at different levels (vertical coherence) that must be complicity with the general commitments of the country. From a temporal point of view, short-term instruments or measures do not contradict long-term policies or commitments;

(e) The fifth principle to be taken into account in adaptation policy scenario is security. The concept of security is welcomed here as a relative of trust. It is important to understand that adaptation is a system of adjustments that provides a certain system of instruments, including behavioural or technical tools that enable it and contribute to its resilience. This is not possible in a troubled socio-land tenure. In Angola, there is no specific land management policy or criteria for the spatial location of certain investments, taking into account the precautionary principle and sustainability.

Possible indices of different types of soil pollution in the country are not known. Land conflicts have imposed a climate of uncertainty and insecurity on farmers and/or peasants. The current statute that imposes the obligation of plans or risk maps in each public administration is an important step to promote caution or minimize losses due to natural disasters in the country. This principle appeals to the community spirit, responsibility and local complicity in adaptive capacity building policies and resilience. Luanda must evolve structural and non-structural measures such as the empowerment of local communities from the promotion of quality education, integrated policies on health to the active participation of the citizens in training processes and public decision-making. Acquisition of technical and monitoring instruments is important. It is advisable to encourage research and development, to establish public-private partnerships in coastal management, institutional strengthening and dialogue between different powers and epistemologies as well as constructions adapted to increasingly uncertain climatic events.

Examples of boundaries and settlement rules along the North Carolina coastline (Freire 2011) or others may promote a healthy environment and sustainability of coastal resources. Construction of light or heavy works should take into account, in addition to other aspects, the historical rate of erosion. As for the knowledge about the socio-environmental risks arising from climate changes, the results are as follows: 949 indicated a value of 0, without information, corresponding to 79% of the sample while 16% is with very poor information, therefore value 1. Only 5% considered to have good information as can be seen in Fig. 5.

Political Decisions Makers

The perceptions about the causes of disordered settlements in Luanda are in general agreement with Bettencourt (2011) in pointing to the lack of political will. Figure 6 helps to perceive the obtained results.

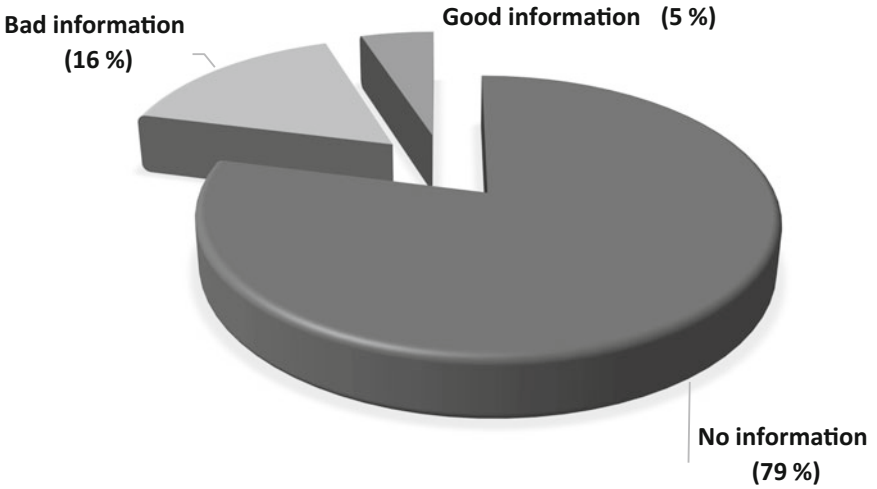

Fig. 5 Socio-environmental risk perceptions (n = 1200)

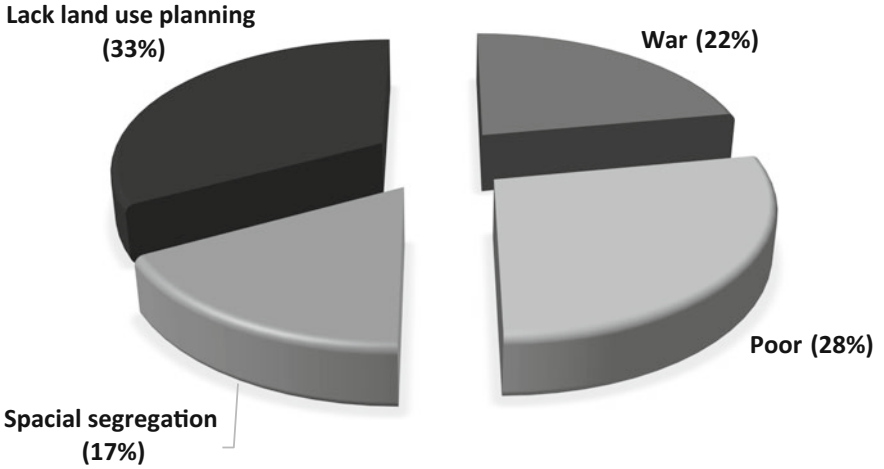

Fig. 6 Perceptions about the cause of disordered settlements (n = 1200)

For Luanda, Bettencourt (2011) points to the lack of political will and bases the statement by listing fifteen instruments or programs that prove the ineffectiveness of policies and instruments of urban management in Luanda since 1943 with the Urbanization Plan approved by the Luanda City Council. As for the other environmental policies, available to the institution, the results point to only four institutions with emergency plans, mainly in cases of occupational accidents.

These four institutions denied that workers had participated in the preparation of such policies. The 15 respondents interviewed are presented in Table 3.

Table 3 Number of respondents and type of responsibility function

Respondents	Number
Director	8
Deputy	4
President of the Board of Directors	1
Secretary of State	2

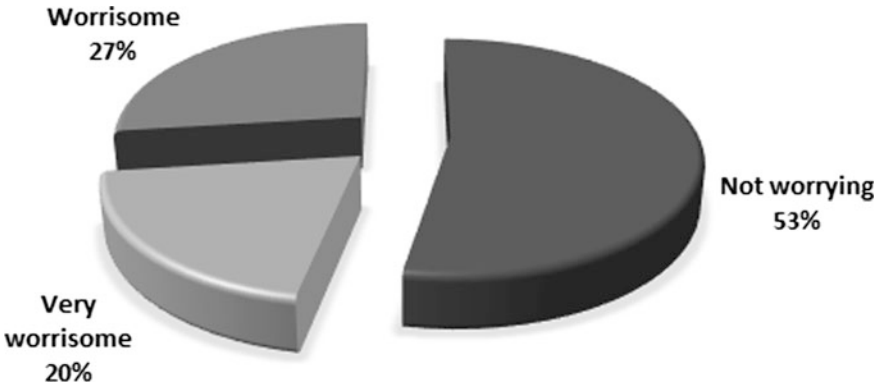

Fig. 7 Assessment attributed to socio-environmental impacts

Considered very highly the socio-environmental impacts in the city of Luanda 27% evaluates as worrying. Those not worried are 53%. Figure 7 shows the evaluation attributed to socio-environmental impacts in Luanda.

The Basic Environmental Law 5/98 requires the creation of a body of community environmental enforcement officers. However, the volume of the 6 urban districts of Luanda was verified, during interviews, that they were not trained by the community environmental inspectors. As fifteen institutions questioned about this reality in Luanda, they demonstrated their lack of knowledge about the existence of community environmental monitoring agents, while one affirmed that it existed. Only one installation left unresponsive to the question asked.

The results regarding the mechanisms of prevention and monitoring of extreme climatic events pointed out that eleven institutions that are unaware of the existence of mechanisms of prevention and environmental monitoring at the level of the State. The respondents stated that they do not exist in the institution.

Seven of the eleven institutions stated that they had a means of warning in cases of fire.

Three said they did not have them in the institutions.

Only one institution claims the existence of instruments for prevention and monitoring of extreme events in Luanda. Of the fifteen institutions, including the Luanda Municipal and Districts Administrations, schools, Civil Protection and Fire Services, Ministry of Construction and others, thirteen are unaware whether or not there is any study on socio-environmental risks and vulnerabilities. To the question

of whether there is a risk map in the coastal zone, twelve institutions are unaware of the fact that three have claimed it does not exist.

Regarding the existence of ecological reserve units, eleven institutions said they were unaware of their existence while three said they were not sure. Only one claimed it existed. Regarding the way land is affected along the coastal zone of Luanda, five institutions claim to have disorder in the form of affectation and access to land, three chose the words anarchy and lack of transparency, four affirmed that the process of affectation occurs normally while three have alleged weaknesses in supervisory bodies.

NGOs

Public approaches to environmental issues are in practice non-existent or irrelevant in terms of scope. Table 4 summarizes how environmental issues are addressed in the community.

Regarding the topics most addressed in the urban districts of Luanda, the results are shown in Fig. 8.

It is clear that issues such as environmental monitoring, mitigation and adaptation to CC are not familiar to the communities of Luanda and have no communication regarding them.

As for the forms of participation of the citizens, it is concluded that they are little involved in the implementation of environmental projects. Figure 9 summarizes how communities participate in environmental projects.

Figure 10 shows the degree of knowledge about environmental legislation, and it was verified that in a sample of 1200, 1007 there is no legal instrument on the environment, which in percentage terms represents 83%, whereas 17% claimed to know of some legislation by hearsay. Of the 17% with knowledge about environmental legislation only 2% cited some laws such as the Environmental Law and Environmental License Act. Figure 11 summarizes the results regarding knowledge of environmental legislation in Luanda.

Angola has a total of 54 legal or legislations produced or received concerning, directly or indirectly, environmental issues. It is therefore a considerable piece of legislation, although the following resolutions have not been published: (a) Convention on the Prohibition of the Import of Hazardous Wastes and the

Table 4 Addressing the environmental issues in the community

Dialogue Estate/NGOs	Yes	38%
	No	62%
Dialogue ONGs/Civil Sociaty	Yes	76%
	No	24%
Dialogue ONGs/ONGs	Yes	83%
	No	17%

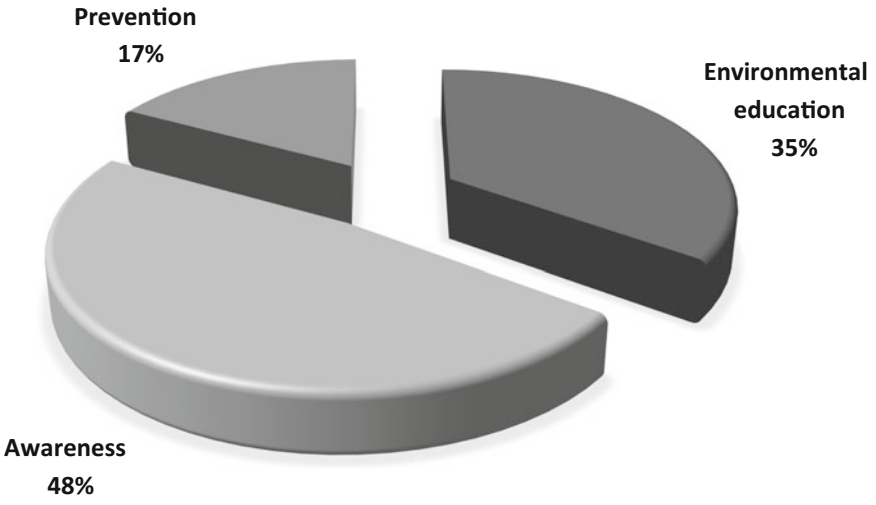

Fig. 8 Thematics that are more addressed by NGOs

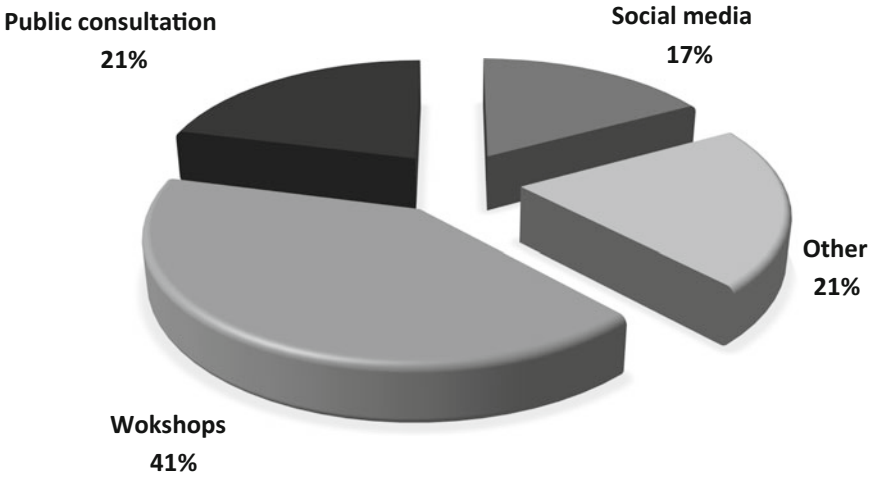

Fig. 9 Forms of community participation

Control of the Transboundary Movement of such Wastes in Africa; (b) the Convention on the Conservation of Nature and Natural Resources in Africa; (c) Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal; (d) Convention on Wetlands of International Importance and (e) the main International Conventions on the Prevention of Oil Pollution by Sea. To a large extent, legislation is produced outside the active participation of citizens and socio-cultural foundations, which jeopardises its ability for effectiveness.

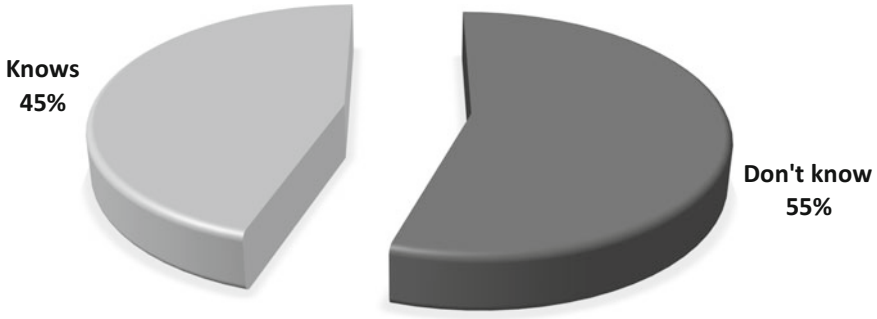

Fig. 10 Knowledge of environmental legislation

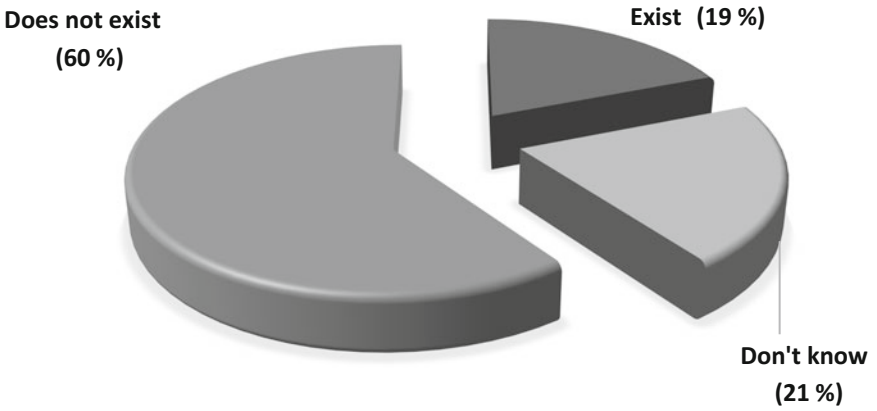

Fig. 11 Information about a programming in the community

National NGOs emerge within a recent historical-political context of Angola marked by democratic openness. The institutionalization of the environment in Angola since 1992 parallels the period of establishment of NGOs. According to the CEI/UC (2013), the initiative of NGOs and civil society is scarce in order to follow the management of public policies and Control of government action. The 2012 Social Report of the CEI/UC (2013) also alleges the lack of political will in the exercise of civic participation.

The question of whether or not there is an ongoing program in the community on environmental issues, the table is as follows: 64% in a sample of 1200 claims there is no on-going program in the community while 23% have no knowledge or information on the implementation of a program with the theme in question. The 13% claim to have some program, but not identified. Figure 11 shows the indexes of information about the existence of a program on environmental issues in the community.

Conclusions

Notwithstanding the complex scenarios that Climate Changes require, it is urgent to move to a new rationality that emphasizes, above all, the culture of integrated risk management as a process instrument of production and decision-making. A strategic vision of governance in the face of the challenges of CC allow us to deconstruct and reformulate the traditional concepts of security and the common good. The lack of environmental governance is an imminent danger that may threaten not only life, natural heritage but also cultural values, the very identity and history of a particular community. Climate Changes are a reality with significant impacts on the natural resources and agriculture of the Angolan people, which is essentially pluvial in a context where droughts have greater expression in Africa. As long as African governments do not translate into social discourse and life the principles and culture for adaptation to Climate Changes expressed in various regional and international instruments, with particular emphasis on Hyogo's actions aimed at reducing disaster risks and mitigating the resulting impacts of CC, the picture of socio-environmental vulnerability may be even worse.

In Luanda, deficient integrated territorial management and participatory governance may lead to policies and strategies that promote better climate governance and the construction of adaptation mechanisms that mitigate exposure to socio-environmental risks. More investment will be needed in the production of scientific knowledge and empowerment of populations on the risks of natural disasters that can be intensified with the occurrence of climate events associated with CC.

It is noted that local and regional decisions and initiatives of institutions in Africa are, above all, reactive regarding risk and socio-environmental vulnerability arising from Climate Changes. Therefore, the difficulties in many sectors of decision making to associate the environmental risk with the socio-political vulnerability that in Africa is very visible. The approach to environmental risk arising from CC is minimised by linking only the environmental risk to the instability of natural biophysical systems. While the influence of physical, biological, or chemical factors on economic systems in man or other living beings, is a structured and complex process that cannot always be monitored by human perception. Little attention is paid to policies considered as vigilant in the management of resources in the framework of sustainability. The low ecological awareness in sectors of Angola's political and social life is well-known.

In Luanda, exposure to risk is associated with poverty, understood as exclusion deprivation and new dynamics in space management. In a situation of poverty, obviously, the alternatives and the options of access to goods and services or structures of power are obstructed, which increases the propensity for vulnerability reducing the capacity of response to the needs of the populations in their daily life. The peripheries of the great metropolis are the picture of this reality. Land occupations are generally not governed by territorial plans and the criteria for locating

housing areas are not known due to lack of soil qualification due to their soil and climatic conditions or aptitudes.

The changes mean little or nothing. The big question is the impacts they trigger by undermining the life and heritage of humanity. Policy makers need to understand Climate Changes from local response capacities and the ways in which human societies position themselves in the face of environmental risk. The magnitude of Climate Changes impacts depends on the degree of institutional, socioeconomic and cultural vulnerability of those that are primarily responsible. In some sectors, geopolitical and economic interests continue to disrupt the understanding of Climate Changes by overriding personal and group benefits to human losses and scientific evidence. In African countries, the climate change approach is still timid, although there is recognition of the emergence of partnerships among some universities in the region on CC.

The budgets for adaptation in Climate Changes are still small. The technological risks associated with the methods of production and consumption in Luanda raise some concern. Some of the objectives and priorities of the NAPA, in addition to being disjointed with the general environmental policy orientation of the country, are at great risk of efficiency because of the lack of resources to make it sustainable.

References

Bettencourt, A. C. de. A. (2011). *Qualificação e Reabilitação de Áreas Urbanas Críticas. Os Muceques de Luanda*. 97p. Tese de Mestrado, Universidade Técnica de Lisboa, Faculdade de Arquitectura, Lisboa, Portugal. http://hdl.handle.net/10400.5/3654.

Cain, A. (2014). *Adaptação às Alterações Climáticas e Gestão de Recursos Hídricos nos Assentamentos Costeiros em Angola*. 40p. Development Workshop, Luanda, Angola. Available at: https://pt.slideshare.net/DevelopmentWorkshopAngola/allan-cain-alteracoes-climaticas-e-assentamentos-costeiros-dw-debate-18072014.

Centro de Estudos e Investigação da Universidade Católica de Angola—CEI/UC. (2013). *Relatório Social de Angola 2012*. Luanda, Angola. Accessed in September, 2014, available at: http://www.ceic-ucan.org/wp-content/uploads/2014/04/RELATÓRIO-SOCIAL-DE-ANGOLA-2012.

Correia, M. A. V. A. M. (2012). *O Património do Movimento Moderno em Luanda (1950—1975)*. 226p. Tese de Mestrado, Universidade de São Paulo, Brasil. Não publicado.

Doing Business. (2012). *Fazer Negócios em um Mundo mais Transparente*. 36p. Banco Internacional de Reconstrução e Desenvolvimento e Banco Mundial (2011), Washington, USA. Accessed in November 2014, available at: http://www.doingbusiness.org/Reports.

Freire, L. F. (2011). *Erosão Costeira: Alternativas de Protecção e Proposta de Solução*. 82p. Dissertação de Mestrado, Instituto de Tecnologia para o Desenvolvimento—LACTEC, Instituto de Engenharia do Paraná. Programa de Pós-Graduação em Desenvolvimento de Tecnologia—PRODETEC, Curitiba, Brasil. Available at: http://sistemas.institutoslactec.org.br/mestrado/dissertacoes/arquivos/LuizFreire.pdf.

Garcia, L. J. S. (2013). 2º *Ciclo de Estudos em Sistemas de Informação Geográfica e Ordenamento do Território. Modificação Recentes no Uso do Solo e na Dinâmica Fluvial em Luanda: a bacia hidrográfica da ribeira da Samba*. 69p. Dissertação de Mestrado, Universidade do Porto, Portugal. Available at: https://repositorio-aberto.up.pt/bitstream/10216/68692/2/28096.pdf.

Lotz-Sisitka, H. e Urquhar, P. (2014). *Enquadramento de Co-Produção de Conhecimentos*. 398p. Estudo de Planificação da Sarua sobre Ocorrências de Alterações Climáticas, África do Sul. Available at: http://www.sarua.org/files/SARUA%20Climate%20Change%20Vol1No1%20KCPF%20PORTUGU%C3%8AS.pdf.

Ministério da Saúde—MINSA. (2013). *Relatório Anual das Actividades Desenvolvidas*, Angola. Accessed in October 2014 http://www.minsa.gov.ao/2014/02/MINSA-RELATÓRRIO-ANUAL-2013.pdf.

OECD (2011). Integração da Adaptação às Alterações Climáticas na Cooperação para o Desenvolvimento: Guia para o Desenvolvimento de Políticas, OECD Publishing. Available at: http://dx.doi.org/10.1787/9789264110618-pt.

Oliveira, S. (2012). Olhar a Pobreza em Angola: Causas, Consequências e estratégias para a sua Erradicação. *Ciências Sociais Unisinos* 48(1), 29–40, https://doi.org/10.4013/csu.2012.48.1.04.

OPSA e ADRA. (2014). *Posição do OPSA e da ADRA sobre o OGE 2014*. Luanda, Angola. Accessed in March, 2015, available at http://www.africa21online.com/artigo.php?a=7596&e=Estudos.

Trindade, A. J. P. (2000). *O Fenómeno Urbano na África Subsahariana: o caso de Luanda*. 488p. Tese de Mestrado, Universidade Técnica de Lisboa, Instituto Superior de Ciências Sociais e Políticas, Lisboa, Portugal. (Not published).

Legislation

Diário da República, 1ª Série – Nº 168 –1st September 2011. Available at: http://admbelas.org/attachments/article/1683/lei_2911_de_1_de_setembro.pdf.

Diário da República, 1ª Série – Nº 210 – 31st October. Available at: http://www.scm.gov.ao/diploma_texto.php?diplomaID=110255.

Diário da Repúblia, 1ª Série – Nº 56 – 22nd March. Available at: http://www.lexlink.eu/conteudo/geral/ia-serie/76730/decreto-presidencial-no4712/14793/por-tipo-de-documentolegal.

Diário da República, 1ª Série – Nº 5 – 2nd February 2001. Available at: http://faolex.fao.org/docs/pdf/ang118157.pdf.

Diário da República, 1ª Série – Nº 27 – 19th June 1998. Available at: http://www.vda.pt/xms/files/Newsletters/Flash_VdAtlas_Angola___Novo_Regulamento_sobre_a_Gestao_de_Residuos_em_Angola_-DM_2312849_1-.PDF.

Diário da República, 1ª Série – Nº 114 – 21st June 2010. Available at: http://bibliotecaterra.angonet.org/sites/default/files/ao_desp_29-10_2106_comissao_tecnica_ordenamento_territorial_e_desenvolvimento_economico_e_social_de_luanda.pdf.