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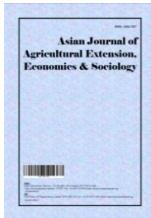
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## **Political, Legislative and Institutional Frameworks for the Governance of Water Resources' Ecosystem Services in Benin**

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### **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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### **ABSTRACT**

Ecosystem services play an important role for the balance of biodiversity and for social well-being. The management of ecosystem services around water resources is governed by several political documents and laws, and involves several actors. Current reforms calling for co-management raise questions about the sustainability of ecosystem service management models around water resources. This article discusses the contours of the legal framework and the institutional mechanism for water resources and their ecosystem services management in Benin. Therefore, the majority of the policy documents set up in the framework of natural resources management were consulted during data collection. Content analysis method was used to analyse these documents. Results show that the governance of water resources and their ecosystem services in Benin is guided by several national political texts inspired by international institutions set up. In Benin, water resources management is based on the declination at national level of the various international and regional agreements ratified by the country. Water resources governance is placed under the responsibility of several political, administrative and civil society actors, in a well-defined role-play system. It is based on vision and strategy documents, action programs, budget programs

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and the National Water Policies, including the Law 044-2010 of November 24, 2010 on water management. However, the processes for implementing these texts do not guarantee the sustainable management of the resources. Indeed, the implementation texts of most of the laws are often not developed, and where they are, they are not widely popularised. There is also a mismatch between adopted legal rules and ancestral cultures and customs. Finally, we noted in the laws and policies, the existence of contradictions, ambiguities and overlapping of responsibilities of the actors in the governance of these resources.

**Keywords:** *Water resources; ecosystem services; political and institutional frameworks; sustainable governance; Benin.*

## 1. INTRODUCTION

The emergence of the concept of ecosystem services is a strong feature of the environmental issue of recent years [1]. At political level, for example, it has been experienced significant enthusiasm since the conclusions of the Millennium Ecosystem Assessment [2], with several recent initiatives such as The Economics of Ecosystems and Biodiversity (TEEB) approach or the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) platform. Indeed, in response to the significant decline of wetlands in recent decades, a collective awareness is emerging. The need for their preservation is written into national and international policies and with it, the desire to improve the management of these areas. Obviously, ecosystem services provide several benefits not only to nature, but also to people. Moreover, Puyderrieux [3] affirms that these ecosystem services are services for the extraction of food, water, wood and fibres, regulatory services such as climate, floods and diseases or even cultural, recreational or spiritual services.

However, it should be noted that low-income countries like Benin are confronted to a double challenge related to ecosystems management: on the one hand, they contribute little to climate and environmental changes on a global scale, but they are particularly affected by their consequences (desertification, reduction in biodiversity, etc.). On the other hand, their own environmental resources are under increasing pressure linked to the process of socio-economic development. Yet, it is recognized that apart from these real benefits, biodiversity plays an important role as an insurance or a safety net in our changing world, especially for the most vulnerable populations whose well-being and even survival often depend more directly on functioning of ecosystems [4]. For them, ecosystem services therefore appear both as a

source of goods and services whose degradation threatens well-being, and as a stake in many human and social choices.

In the field of water and environmental management, for example, even if the social benefits deriving from the provision of ecological services often serve as a justification for actions to protect and restore aquatic environments, it is clear that the value and the importance of these services are more often mentioned than measured in fact [5]. Water is essential for life, yet millions of people around the world lack water while others die from water-borne diseases. The water crisis is resulting in the loss of many lives around the world; 3,900 children die every day from water-borne diseases [6]. In Africa, less than 60% of the total population has access to water and sanitation services according to the same source. According to UNDP [7], in Benin, projections suggest a continuous drop of 10 to 20% in rainfall by 2025 and a drop in agricultural production of around 23% by 2020 in certain regions of the country. The variability of rainfall is often combined with extreme weather events. According to the 2007 IPCC report, these extremes have changed in frequency and / or intensity over the past 50 years, resulting in devastating floods, droughts, storms and sudden changes in temperature. Access to drinking water is an essential and vital element of economic and human development. Despite this very important role that water plays in the lives of beings (human, animal and plant), voices are raised to decry the way in which this natural resource is managed especially by human beings. An effective water policy requires good regulation of water resources and the participation of all citizens in its definition and monitoring [8]. Currently, many legal systems at national, regional and international levels allow harmonising the sustainable management of ecosystem services of water resources. The majority of African countries have already made significant progress in adopting modern water

laws. The majority of them have a water code which establishes comprehensive regulations. Others do not yet have specific legislation.

In Benin, the available legal arsenal relating to the protection and safeguard of natural resources including water resources is important and diversified. These legal instruments have been regularly reinforced by provisions adapted to the international commitments made by the country and to the evolution of the socio-economic and cultural framework [9]. However, these legal documents have limitations preventing them from sufficiently addressing the challenges of accessing and managing resources. In any case, it should be noted the lack of dissemination of the contents of the regulatory rules and other legislations specific to water resources in many West African countries. The problem of managing these resources remains despite the efforts made.

To help solve this problem, several authors such as Ostrom [10,11], have worked for a sustainable management of the commons by proposing principles which can promote it. They noted opportunistic behaviours of the actors which, even when the will is displayed on the part of the managers, can go against sustainable management. Beerbohm and Davis [12], have argued that taking justice into account in the management of the commons properties makes it possible to avoid distribution biases which, under certain conditions, favour a particular group. Obviously, this consideration of justice must be based on the distributional neutrality of natural resources [12]. Citizen participation, which until now has been put forward in the management of natural resources in Benin, aims to ensure their sustainability.

The various studies carried out on the management of ecosystem services around water resources show not only a crisis of confidence between the various actors, but also a divergence of understanding of the implementation of the texts.

Institutionally, the water sector in Benin is characterized by a multiplicity of decision-making centres, sectoral management and insufficient collaboration and consultation between stakeholders. Water management is therefore sectoral, fragmentary and compartmentalised, with an absence of intersectoral coordination resulting in high economic, social and ecological costs [13]. This paper aims at analysing the

institutional and political framework set up in Benin to constrain and facilitate the sustainable management of natural resources in general and water ecosystem services in particular. The framework is analysed in light with the Ostrom's common goods theory and the strategic analysis of environment management theory.

### 1.1 Ostrom's Theory of Common Goods

Ostrom's common good governance theory favours the distribution and management of natural resources by collectives [14]. While privatisation or state management were the solutions recommended by standard theory, Ostrom [14] demonstrates the existence of collective property regimes, explains how they work, and identifies criteria that characterise organisations that have endured over time. Thus, it suggests the participation of members in the definition of common rules in order to limit the overexploitation that Hardin [15] qualifies as "the tragedy of the commons". Indeed, for a resource for common use, individuals tend to maximize their interest in its use, at the same time reducing the chances of others to access it optimally and therefore increasing the cost for the whole community. Ostrom [14] proposes a third path consisting in letting users create their own systems of governance, through collective action defined as action carried out by more than one person and oriented towards a common objective or the satisfaction of a common interest which cannot be obtained by the action of a single individual.

To call on this theory of Elinor Ostrom, we will seek to understand how actors organise themselves to collectively manage common resources, particularly the ecosystem services of water resources, and what are the factors that determine their actions. Ostrom's work on this has tried to prove that taking institutions into account enables public policies to be more effective. Institutions are defined by Crawford and Ostrom as widely adopted rules, norms or strategies which motivate one to adopt a certain behaviour in the face of repetitive situations [16]. Formally, institutions can present themselves as a law, a policy or a procedure or they emerge informally as norms, standard practices or habits.

Ostrom establishes eight principles that the commons properties must respect to allow their protection by the communities of actors [17]: (1) the resource and the rights holders must be clearly defined; (2) the rules for managing the

resource must comply with the realities of the local environment and the objectives of the beneficiaries; (3) the beneficiaries must participate in the development and modification of management rules; (4) the agents responsible for the implementation of these rules must be accountable to the beneficiaries; (5) there must be a graduated system of penalties for violation of the rules; (6) the system must provide for quick and easy access to local authorities to resolve potential conflicts; (7) higher authorities (states) must recognise the right of local authorities to self-manage resources, thus guaranteeing the principle of subsidiarity; (8) where there are large common resources, nested management arrangements can be designed. These are general principles, however, which do not exempt from a case-by-case analysis.

Ostrom revisits the question of user rights by placing the notion of common property at the centre of the analysis. In the situations that it describes, the "common good" is neither in free access (case described by Hardin), nor in exclusive and absolute individual property: the rights of use are held by a group which sets up institutional, formal or informal arrangements between individuals on the basis of common social norms. Customary rights, revitalised where necessary or adapted to the circumstances, can play an important role. The limitations of this Ostrom theory come from the fact that it is only applicable to small groups. Indeed, for larger groups, the divergent interests and the divisions that follow can weaken the group and very easily call into question the usual compromises and social cohesion.

The recourse to modern law is essential in the contemporary context because common property presupposes the exclusion of third parties (non-rights holders, external to the group) which must be made formally enforceable. Hence the need to have recourse to a higher power, that of the central State which plays the role of arbiter between all the actors by defining a common line of conduct and by making the various actors accountable according to their specificity and their areas of intervention.

## 1.2 Strategic Analysis of Environmental Management

For four decades, the spectacular emergence of the environmental question on the political and scientific scenes has directed the attention of actors in public life, and researchers, towards the

multiple ecological systems whose qualities are threatened [18]. These authors assert that the place taken by problems of this type on the public scene goes hand in hand with a proliferation of social, political, administrative initiatives, to take them in hand. This multifaceted activity resulted in two types of learning. On one side, it led to the gradual constitution of a set of commitments made to the public in terms of environmental management in general, and of water ecosystem services in particular (consisting of, for example, nature protection laws, the international Ramsar convention on wetlands, protocols for reducing greenhouse gas emissions, etc.). On the other side, it has put in place innumerable, diverse, often complex and sometimes large-scale management systems (for example, protected areas, agri-environmental measures, parafiscal taxes for waste management, etc.).

The perspective of management research that is ours, gives this necessary theoretical work specific expectations. On one hand, it calls for conceptual constructions within which questions of action, responsibility, the links that unite them, occupy a decisive place. On the other hand, it leads to works where what is put to the test above all is the capacity of a proposed theoretical (re) framing to found readings that renew, in a way that is enlightening with regard to the questions of responsibility and action, the way in which one can articulate between them the managerial discourses which intersect, the management systems that become entangled.

Let's sum it up in a few words: if there is an ecological "problem" that existing management is struggling to resolve, consider changing the management system; improved coordination, collaboration in action are only particular aspects of this change, which there is no reason to consider a priori as central, even less as sufficient. The problem of change, intrinsic to most of the environmental management situations encountered, prompted us to place at the center of our analyses the project of identifying, in concrete environmental management situations, the conditions for a change in management, without postulating them at the outset. Hence the proposal of a framework for a strategic analysis of environmental management, articulated around four organizing principles [19,20]:

- Support the analysis of the action system linked to an environmental problem on a prior definition, in ecological terms, of the

object to be taken into account and the objectives pursued: "goals in nature, means in society";

- Take into account, in the diagnosis of environmental management and therefore of ecosystems, all the anthropogenic actions that have a decisive influence on its existence and quality;
- Pay a particular attention to the actors whose main mission is to bring appropriate changes in the effective management of the ecological object. These are in fact the actors who, in a given situation, actually play (both in the discourse and through their observed actions), towards the actors responsible for processes that are harmful to the environment or the actors, regulators (local elected representatives, prefect, etc.), a role of agent of change in favour of the environmental objective referred to;
- Put back these analyses in the dynamic perspective of a management system that changes and structures itself over time under the structuring effect of conflicts, through which the concerns raised by intentional management interventions end up being partially integrated.

These four principles taken together provide a decisive reframing for the analysis of environmental problems. They make it possible both to refer to the legal texts applicable to all and binding on all; likewise, they define the governance framework for responsible management of ecosystems and the goods they provide.

## 2. METHODOLOGY

Qualitative method was used for this research. Data were collected from documents on policies and laws governing the organisation and management of natural resources in general and particularly water resources and their associated ecosystem services at national, regional and international levels. Content analysis was used to analyse the data collected in the legislative, institutional and policy documents. The content analysis consisted in identifying the data sources (documents), developing categories based on

the research questions and establishing decision rules on how to classify the items in the different categories. The Table 1 below shows the documents analysed for this research.

The analysis of the contents of these documents enabled to appreciate the innovations in the institutional frameworks for the sustainable water ecosystem services management in Benin. The contents of the documents were also analysed by checking the consistency of the laws and Policies with the principles mentioned in the theory of Ostrom (1990) in common goods governance.

## 3. RESULTS

### 3.1 The Legal and Political Framework for the Governance of Water Resources in Benin

Several laws and decrees have been set up, voted and ratified at international, regional and national levels to facilitate the governance of natural resources in general and particularly ecosystem services around water resources in Benin.

#### 3.1.1 At International level

Benin has signed and ratified most of the international agreements and conventions related to the management of water, environment and associated ecosystems. The country took an active part in all the major meetings which opened and then marked out the path of integrated water resources management (IWRM), in particular:

- Informal Copenhagen Consultations of November 1991;
- Dublin Water and Environment Conference January 1992;
- Rio Conference on Environment and Development in June 1992 and sanctioned by Agenda 21 and the adoption of IWRM by the international community; and
- United Nations Framework Convention on Climate Change of 21 March 1994.

Benin also took part in the process of monitoring the results of the Rio conference marked by the meetings of the United Nations Commission on Sustainable Development, the successive world summits organised by the United Nations and the World Water Forums namely:

- the process of drawing up the "West African Vision on water, life and the environment for the 21st century" presented at the 2nd World Water Forum in The Hague (March 2000);
- the World Summit on Sustainable Development (WSSD) of Planet Earth, held in 2002 in Johannesburg (South Africa), during which the International Community recognised IWRM as a key element to achieve the "Objectives of the Millennium Development Goals" (MDGs) relating to drinking water and adequate sanitation services on the one hand and invited all states to develop and implement a national action plan for water resources management (PANGIRE: Plan National de Gestion Intégrée des Ressources en Eau:) by 2005 on the other hand.

**Table 1. Documents analysed for this research**

Type of Documents	Documents Title	Year
International agreements	Ramsar convention related to humid zones Informal consultations of Copenhagen in November 1991 Dublin conference on water and environment of January 1992 Rio de Janeiro conference on environment and development Framework convention of United Nations on Climate change Process of elaboration of the « West Africa vision on water, life and environment for 21st century » presented at the 2 <sup>nd</sup> worldwide forum on water at La Haye	1971 1991 1992 1992 1994 2000
Decrees	Decree of September, 29 1928 and related texts on water code in Benin. Decree N°2001-109- setting up the norms and quality of residual water in Benin Republic Decree N°2001-94 setting up norms and quality of drinkable water in Benin Republic Decree N°2001-574 on the creation, attribution and functioning of the Water National Council Decree N°2011-621 on the creation, attribution, composition and functioning of the Basin Comity Decree N°2011-671 of October, 05 2011 setting the procedures in delimitation of protection perimeters around a water catchment	2001
Policies	Law N°87-616 of September, 21 1987 on water code in People Republic of Benin. Law N° 97-029 of January, 15 1999 organising Districts in Benin Republic Law N 98-30 of February, 12 1999 on framework law on environment National policy on water approved by the key actors of the sector in January 2008 and adopted by the government on July 2009 Law N° 044-2010 of November, 24 2010 on water management in phase in Benin Republic	1987 1999 2009 2010
Strategic programmatic instrument at national level	National strategy for natural resources and water management in Benin Strategic document for poverty reduction 2003-2005 Strategic document of growth for poverty reduction related to priority interventions on water and sanitation	1997 2002 2003-2005 2007-2009 2011-2015

These various agreements aim at defining the main strategies of the National Programs for the Integrated Management of Water Resources, namely:

- put in place competent human resources in sufficient numbers with an appropriate continuing training system;
- better know the available water resources;
- better use and enhance the value of water to support the socio-economic development of the country;
- establish good water governance with coordination of actions, judicious involvement of non-state actors;
- satisfy, in a sustainable manner, the various water demands, taking into account the availability of the resource;
- ensure the sustainability of ecosystems;
- hedging against the negative effects of water, both physical (floods) and health (water-related diseases);
- put in place an adaptation policy to the impacts of climate variability and change on water resources.

### 3.1.2 At regional level

Benin actively participated to several gatherings in the framework of water resources management such as:

- the West African conference on integrated water resources management (IWRM) in March 1998, which resulted in the Ouagadougou Declaration,
- the development of the Regional IWRM Action Plan for West Africa adopted in December 2000; and
- the creation of a permanent framework for the coordination and monitoring of IWRM, the Water Resources Coordination Unit based in Ouagadougou currently called the Water Resources Coordination Centre within the Economic Community of the States of the West Africa (ECOWAS) adopted in December 2001.

The governance of water resources in developing countries (DCs) of which Benin is part of, undoubtedly constitutes a major political, economic and social issue that governments and international institutions identify as a priority on the political agenda of the 21st century. This concern is the result of discussions that have

been initiated mainly since the 1970s at major international conferences. The second United Nations world report on the development of water resources, made public on the occasion of the Mexico City World Water Forum (March 16-22, 2006), once again insists on this point, to highlight the need for collaborative work between governments, private firms and civil society [21].

In relation to ecosystem services, The Ramsar Convention on Wetlands is the first modern treaty with a worldwide scope on the conservation and wise use of natural resources and habitats. Since its adoption in Ramsar, in Iran, in 1971, it has served as a framework for intergovernmental cooperation on wetlands. This convention is one of those pioneering texts which sought to enhance the functions of ecosystems before the emergence of ecosystem services on the international scene. Despite the progress Ramsar has made since 1971 especially in promoting awareness of the importance of wetlands, the loss, destruction, degradation and misuse of these areas continues in many parts of the world as it is the case in Benin where several water resources providing goods for the benefit of the populations are in the process of disappearing.

The Conference of the Parties to the Ramsar Convention on Wetlands therefore considered the choice of terms to use, particularly in relation to ecological characteristics, from 2005. Article 3.2 of the text of the Ramsar Convention, provides that "each Contracting Party shall take the necessary steps to be informed as soon as possible of changes in the ecological character of wetlands located in its territory and included in the List, which have occurred, or are occurring or are likely to occur".

### 3.1.3 At national level

Benin has adopted several strategic planning instruments for water resources management, which can be divided into four categories: (i) vision and strategy documents, (ii) action programs and budget documents, (iii) National Water Policy documents. The Table 2 below presents these instruments.

According to the analyses made by the office for the evaluation of public policies in Benin (2012), the legal and regulatory framework for water management has long been governed by Law No. 87-616 of September 21, 1987 on the Code of water in the People's Republic of Benin. However, it is clear that the provisions of this law

have hardly been applied as a whole and the causes of this situation are multiple: (i) application texts not developed; (ii) contradictions, ambiguities and overlapping responsibilities; (iii) non-popularisation of the previsions of the law; (iv) mismatch between adopted legal rules and ancestral cultures and customs.

### **3.2 Analysis of the Coherence of the Legislative and Political Framework for the Management of Ecosystem Services with the Principles of Ostrom (1990)**

Despite this legal arsenal at the national, regional and international levels, difficulties remain regarding their application and their respect by the different parties involved in the governance of ecosystem services of water resources. The existence of a legal framework sufficiently shows that access to drinking water and the cleanliness of the living environment are a long-standing concern in Benin. However, the quality and / or quantity of water are still essential problems of almost all urban and rural areas, either in terms of unmet needs, or in terms of poor management, or in terms of availability and / or of the quality of service [22]. Indeed, despite the large quantity of water recorded each year and despite the various existing water sources throughout the national territory, difficulties remain in their management to the point of reaching very significant shortages to cover the consumption, production and transformation needs of populations. The same is noticed with regard to the other ecosystem services these water sources provide to the local communities.

By focusing on the principles of management of water resources and ecosystem services as evoked by the various theories and particularly the theory of Ostrom (1990), an analysis of the consistency of these various legal texts with the principles evoked in this theory of Ostrom allows us to assess the real situation of ecosystem service management as presented in the Table 3 below.

The analysis of the Table 3 above shows clearly that most of the different laws and policies set up for water resources and their associated ecosystem services management in Benin take into account almost all the principles described by Ostrom [14] in the framework of the sustainable natural resources management. If natural resources are still not well governed, the

problem may reside in the implementation of these laws and policies and their enforcement. The large majority of the legal texts governing the management of natural resources in general, those of ecosystem services of water resources particularly, are not well known by the populations or they are very little known. Indeed, they are written in French in a country which has nearly 63% of illiterates and little efforts are made by the government to teach them. Local communities in contact with and depending on these resources are not aware of their management institutions. At the same time, no effort is made to translate them into national languages. As a result, we are witnessing abuses in their use, non-compliance with common management rules, the proliferation of unsavoury practices in the management of water resources and the ecosystem services they provide.

### **3.3 Innovativeness of the Institutional and Legislative Framework for the Management of Ecosystem Services**

To regulate the management of water resources in the Republic of Benin, the legislator has made legal provisions for the proper management of the ecosystem services they generate. It appears that the application of these laws comes up against difficulties, because they are very little known by the populations due to their low popularization and the high rate of illiteracy of the populations for whom they are however intended. However, the strong interest in innovativeness can be explained by the fact that any company that launches new products on the market aims, in the more or less short term, to facilitate their adoption by its customers. In this case, the populations referred to here as clients do not know the content of the laws; hence the difficulty of respecting them. At the same time, we note that efforts remain to be made at the central state level to facilitate the disclosure of these different laws at the population level for better management of water resources and the ecosystem services they provide.

In addition, laxity in the application also remains the Achilles heel that encourages carelessness. A situation that leaves little room for innovativeness, which in principle should guarantee the sustainability of the resource and the goods it generates. Indeed, even if in terms of propensity there is in the various laws a will of the legislator to optimize the management of water resources and to create the conditions

necessary to better manage them, the fact remains that all the conditions are not met to achieve this objective. With regard to the cost, the practices observed leave much to be desired to the point of transforming the ecosystem services initially considered as natural goods into rare, sought-after economic goods that are difficult to access by populations. Nowadays, drinking water, water for agricultural needs has become in certain regions of northern Benin a rare commodity and much sought after by the populations.

### **3.4 Organisational and Institutional Frameworks**

In Benin, governance of the management of ecosystem services in water resources is provided by the Ministry of Water and Mines. This ministry concentrates a bundle of responsibilities, even if it leaves a certain number of prerogatives to other sectoral ministries such as the ministry of agriculture, livestock and fisheries, the ministry of living environment and sustainable development, and the ministries of justice, decentralisation and defense.

However, it should be noted that since the 1990s a change of direction has been perceptible in the priorities of Benin's water policy. In fact, following the pressures exerted particularly by the World Bank, aiming at limiting the role of the State, the participation of users in the local management of water resources for irrigation becomes one of the stated priorities of the national policy of the water. Thus, the involvement of users in the decision-making process is increasingly accompanied by a movement to transfer responsibilities to local communities. Law No. 2010-44 on water management in the Republic of Benin stipulates in its article 6 that "every Beninese citizen has the right to have water for his needs and the basic requirements of his life and his dignity. ". Further on, article 13 of the same law stipulates that "customary practices as well as local conventions, as long as they do not compromise the achievement of the objectives of this law and do not contradict its provisions, are taken into account by the authorities in charge of water management". Despite these provisions, difficulties remain. According to informants, the strategy for transferring skills in the water sector deserves to be reviewed to facilitate access to

this resource for populations on the one hand, and to conserve it sustainably on the other hand.

Water governance in the Republic of Benin is therefore the result of a compromise between the actors and the public and community regulatory instruments. Thus, the management of water resources is ensured by several actors who intervene directly or indirectly in various aspects of management and use of water resources. According to the document GWP / WA (2009), there are three main types of public structures that have important roles in the management of water resources:

- Public structures with a specific vocation: these are typically water-oriented institutions. Several of their responsibilities mention involvement in the water sector;
- Structures with indirect responsibility whose activities have in one way or another a link with the management of water resources;
- General control structures of state.

The Fig. 1 below summarises the institutional framework for water resources management in the Republic of Benin:

At the institutional level, the water sector in Benin is characterised by a multiplicity of decision-making centres, sectoral management and insufficient collaboration and consultation between stakeholders. Water management is therefore sectoral, fragmentary and compartmentalised, with a lack of inter sectoral coordination resulting in high economic, social and ecological costs (PANGIRE, 2011). It appears that Benin does not have, for the moment, an effective and operational instrument for the management of water resources in harmony with the principles of IWRM.

The preponderance of the role of public institutions leaves very little room for local communities, private and community institutions. Admittedly, the roles by actors are clearly defined by the texts and laws, but, despite their wishes, the actors involved do not always have free hands to take initiatives for the good conservation of water resources and goods or ecosystem services they generate.

**Table 2. Strategic planning instruments for water resources management in Benin**

Strategic planning instruments	Contents	Analysis of the consistency of the practices with the content
Benin's national water resources management strategy (1997).	<ul style="list-style-type: none"> <li>- improvement of institutional and financial frameworks and preparation of legislative and regulatory texts;</li> <li>- monitoring and processing of water resources data;</li> <li>- preservation and conservation of water resources;</li> <li>- prioritisation of water needs;</li> <li>- installation and rational operation of water collection and distribution equipment;</li> <li>- capacity building of the actors involved in the management of water resources;</li> <li>- rational management of water resources;</li> <li>- establishment of the National Water Fund</li> </ul>	<p>This strategy, which should take its source from grassroots water user populations, has been the work of intellectuals in the sector. Strategic planning has not been participatory or inclusive.</p>
Poverty Reduction Strategy document 2003-2005	<ul style="list-style-type: none"> <li>- guarantee access to drinking water for all;</li> <li>- ensure the permanent and sufficient availability of water resources for industrial, agro-pastoral and fish-farming production.</li> </ul>	<p>Lack of clear strategic goals and direction. Suggestion of a list of classic good intentions to be achieved in the sector.</p>
Growth Strategy Document for Poverty Reduction 2007-2009, in relation to priority interventions in the water and sanitation sector	<p>It concerns:</p> <p>the infrastructure development policy in the water sector (transport, energy, hydraulic and sanitation).</p> <p>the water control for productive and sanitation purposes</p>	<p>the strategy does not fully integrate all the intervention areas contained in the Strategic Development Objectives that it should operationalize. It does not include clearly defined intervention areas, objectives, indicators and targets;</p>
Growth and Poverty Reduction Strategy Document (GPRSD) 2010-2015	<p>It integrates the best management of water resources, as one of the priorities as a lever for the economic development of Benin.</p>	
National water policy validated by key players in the sector in January 2008 and adopted by the government in July 2009	<ul style="list-style-type: none"> <li>- the only law specific to the water management sector in Benin</li> <li>- integrates the various reforms undertaken in the context of decentralization</li> <li>- clarifies the role of actors within the framework of decentralized management of water resources at the national level</li> <li>- replaces the old water code dating from 1987 which has become obsolete</li> </ul>	<p>As a weakness we note:</p> <ul style="list-style-type: none"> <li>- the predominance of public institutions, which does not reflect the great diversity of actors;</li> <li>- the scattering of decision-making centers, the overlapping of skills, redundancies and competition, even conflicts between actors;</li> <li>- the weakness of collaboration and consultation between the players in the sector.</li> </ul>

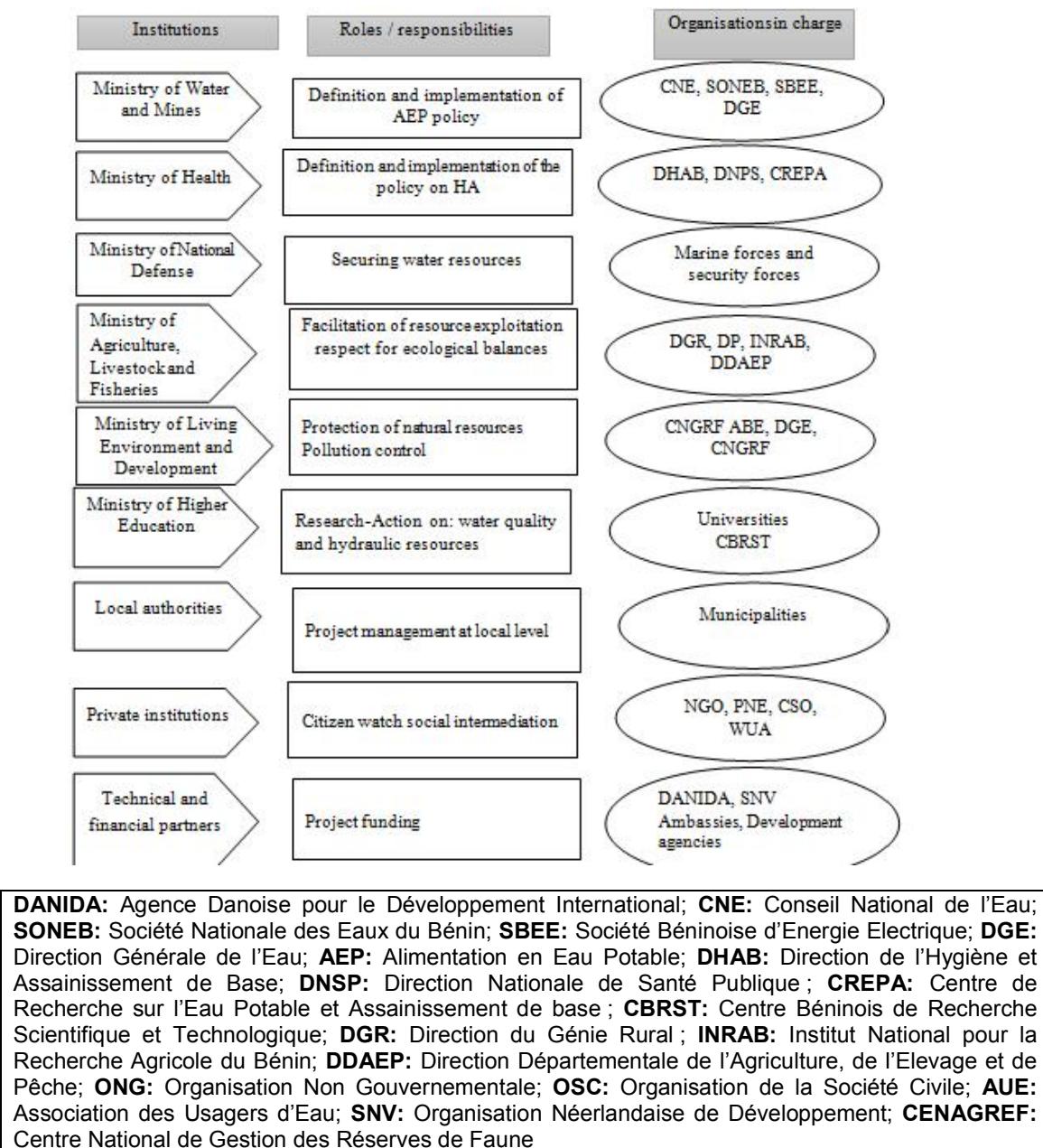
Law 044-2010 of 24 November 2010 on water management in line with the guiding principles of the approach.	<ul style="list-style-type: none"><li>- establishes the principles relating to the management and special protection of water;</li><li>- specify the legal status and the water regime;</li><li>- defines the institutional framework and public interventions in the sector, planning and financing instruments, prospective and penal provisions.</li><li>- it aims to put an end to purely sectoral management, much centralized, inefficient and which does not preserve the water resource in its multiple social, economic and cultural dimensions.</li></ul>	Same as for the 2009 national water policy
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**Table 3. Analysis of the consistency of the laws / Policies with the principles mentioned in the theory of Ostrom (1990)**

<b>Management Principles</b>	<b>Laws / Policies</b>	<b>References and Content</b>	<b>Analysis</b>
The resources and their beneficiaries must be clearly defined	Law n ° 2010-44 of 24 November 2010 on water management in Republic of Benin	Article 6 of the law stipulates that: "every Beninese citizen has the right to have access to water for his needs and the basic requirements of his life and dignity". Article 7 said the use of water, in any form whatsoever, requires everyone to contribute to the nation's effort for the rational management of this resource".	The rational management of water remains a major problem in view of the tendencies to waste that are observed without respecting the elementary rules of management of common goods. The first to come help themselves without worrying about others. Hygiene rules are poorly respected around water resources, the withdrawals of resources and goods procured do not often respect the principles of joint management of goods. A situation which is often the basis of conflicts which are often observed around water points.
The rules for managing the resource must comply with the realities of the local environment and the objectives of the beneficiaries;	The convention on wetlands (Ramsar, Iran, 1971)	Article 13 of the law on water management which stipulates that: Customary practices as well as local conventions, as long as they do not compromise the achievement of the objectives of this law and do not contradict its provisions are taken into account by the authorities in charge of water management.	Despite the existence of good customary practices regulating the use of ecosystem services from water resources, we still see their misuse through their destruction, their degradation with the risk of compromising the future of future generations.
Participation of rights holders in the development and modification of management rules	The convention on wetlands (Ramsar, Iran, 1971)  Law n ° 2010-44 of 24 November 2010 on water management in Republic of Benin  National Action Plan for Integrated Water Resources Management	Article 12 stipulates that: "In all projects for the enhancement, mobilization, protection and conservation of water resources, the State and local authorities encourage the participation of natural and legal persons governed by private law from the national sector of water, provided that considerations of general interest or efficiency do not preclude it".  Article 9: The State and local authorities, in their respective areas of competence, ensure the sustainable management of water, with a view to guaranteeing users fair access "	Efforts are being made with regard to the water resources management policy with a strong involvement of local authorities and populations grouped together in water resources management committees or in associations of water point users. However, due to the high rate of illiteracy of the populations on the one hand, and the low interest in reading, the various laws are very little known to these populations which are consequently very little involved in the design of the management rules which however apply to them.

The agents responsible for the implementation of these rules must be accountable to the beneficiaries.	Law n ° 2010-44 of 24 November 2010 on water management in Republic of Benin	Article 29 states: "within the framework of water management, the State and the decentralised territorial collectivities assume at all levels, the establishment of appropriate structures and the participation of the actors concerned	The low municipal contracting authority in the sector does not promote the effectiveness of the intervention of local authorities to better guarantee the sustainability of the resource and the goods it provides. The central state monopolises initiatives and assumes almost alone the responsibility towards the beneficiaries; In the rare cases where competences are transferred by the central state to municipalities / local authorities, they are not followed by the transfer of resources; which limits their effectiveness of action.
There must be a graduated system of sanctions in case of violation of the rules	Law n ° 2010-44 of 24 November 2010 on water management in Republic of Benin  Law n ° 98-030 of February 12, 1999 on the framework law on the environment in Republic of Benin	Articles 72, 112 to 115 of Law No. 2010-44 of 24 November 2010 provide for gradual sanctions for any infringement in the protection of surface / continental or groundwater /. These offenses are punishable by imprisonment of two (2) months to twelve (12) months and a fine of five hundred thousand (500,000) to two million (2,000,000) CFA francs or one of these two sanctions only. In case of a repeat offense, the prison sentence is increased to eighteen (18) months of imprisonment and a fine of five million (5,000,000) CFA francs ".	Sanctions exist but not often applied to offenders; Traditional values are increasingly undermined by the courts and thus, traditional dignitaries no longer have a free hand to act and sanction.
The system must provide for quick and easy access to local authorities to resolve potential conflicts	Law n ° 2018-20 of April 23, 2019 on the Pastoral Code in the Republic of Benin	Article 85: "Disputes related to pastoralism are settled amicably between the parties. If this method of settlement fails, disputes are brought to the competent branch of the National Transhumance Management Agency (ANGT). If necessary, the competent branch of ANGT assesses the damage caused with a view to compensating the victim.	The current legal system promotes innovativeness at the local level to resolve any conflicts that may arise around the management of water resources. Several cases of conflicts over water resources are resolved at the local level by traditional or religious authorities However, more and more, we are witnessing fratricidal wars, especially between breeders and farmers around water points, so that their settlement often exceeds the powers of local authorities and is brought to the police stations or the courts of first instance. More and more, the conciliation tribunals at the local level are becoming incompetent to settle these cases of conflicts which multiply elsewhere

higher authorities (states) must recognize the right of local authorities to self-manage resources, thus guaranteeing the principle of subsidiarity	Law No. 2010-44 on water management in the Republic of Benin.	In the context of water management, the State and decentralised territorial communities ensure, at all levels, the establishment of appropriate structures and the participation of the actors concerned (Article 29). In addition, according to article 9 of the same law, the State and local authorities, in their respective areas of competence, ensure the sustainable management of water, with a view to guaranteeing users' fair access.	Although the various legal provisions clearly distribute the roles between state, municipal and local actors, the principle of subsidiarity remains to be improved. Indeed, the management of resources is now entrusted to local authorities set up by the populations themselves through management committees, water users associations, or to farmers who report to the municipal authority. A management method which should promote the sustainability of the resource, its rational use by the community. However, the management of these instances remains to be desired. We are witnessing the embezzlement of funds and bad management with the consequences of the scarcity of the resource, the destruction of the goods generated and the development of cases of fratricidal conflicts which compromise social cohesion.
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**Fig. 1. Institutional framework for water resources management in Benin(GWP / WA, 2009)**

According to the provisions of Law 97-029 on the organisation of municipalities in the Republic of Benin, the municipalities are responsible, among other things, for creating water infrastructures for the benefit of the communities in their territory and for ensuring their maintenance and regular maintenance. However, these municipalities are increasingly deprived of part of this prerogative which is retained by the central state, rightly or wrongly. In fact, with the creation by the

Government of a new agency responsible for building water infrastructure, the municipalities no longer have a free hand for all initiatives in this sector, contrary to the provisions of the law which govern them.

However, if innovativeness should be assessed through the three dimensions which are: the propensity to innovate, the capacity to innovate and the practice to innovate, we note that the

central State remains in its traditional way of governance of the sector despite the various national, regional and international conventions ratified by itself. Suddenly, the will to innovate at community, municipal and civil society level takes a hit. Anything that prevents innovativeness.

There is also a fragmentation of roles, overlapping of competences, redundancies in responsibilities, weak collaboration and weak consultation between the actors. The effective management of ecosystem services related to water resources requires the good coordination of different actors and the effective dissemination of information in order to maximize efficiency and effectiveness at the sector level.

The water sector in Benin is characterised by a multitude of decision-making centers, sectoral management and insufficient collaboration and consultation between stakeholders. Municipalities, local authorities, civil society organisations, technical and financial partners, each in its role, support the central state in the management of water resources and the ESS they provide. Better coordination of the institutional framework would avoid messes and conflicts of attribution often recorded around these resources and which are sources of threats to social cohesion.

### **3.5 Governance of Water Resources and Decentralisation**

The laws on decentralisation in Benin, confer to the municipality, a decentralised territorial collectivity, the responsibility of building the infrastructures for the benefit of the populations of its territory (article 83 of law 97-029). In accordance with this law, the municipalities support the State, which delegates to them a part of its responsibilities for the management of natural resources in general, water resources and the goods they provide in particular (ecosystem services). Thus from 2004, within the framework of the elaboration of the Communal Development Plans (CDP), the communes (through the consultations of the populations and the various actors on their territories) programmed the realisation of hydraulic works, the rehabilitation existing water sources to improve public services related to the provision of potable water, as well as water for other community needs. At the strategic level, the CDPs provide for specific provisions for optimal management of these ecosystem services

generated by water resources in order to guarantee their availability to populations at all times and in all places with inclusive management.

Through its development plan and budget, the municipality implements the priorities of its populations in terms of drinking water supply, management of natural resources and protection of existing water resources. At the same time, the ecosystem services provided by water resources for the benefit of communities. This effort at the municipal level is also noticeable at the community level where the populations make their contribution in the form of financial and / or in-kind participation for the implementation of projects and programs in the water sector and the protection of ecosystems. It is also at this level that users are involved in a dynamic of sustainable management of equipment in their localities; they participate in citizen watch and the mobilisation of populations for their good use. Thus, water resources management committees set up in rural areas support the efforts of other actors at the central and municipal level as well as the efforts of Technical and Financial Partners (PTF) to ensure the sustainable and long-lasting management of the goods provided by the water resources.

From the analysis of the current situation, it emerges that the ability of the municipalities to properly fulfill their duty in this regard is compromised due to the reluctance of the central State to transfer resources to them in accordance with the provisions of the law which governs them. Very few initiatives are undertaken on the side of local communities to ensure good management of existing structures. Indeed, it is not uncommon to find water structures that have broken down without any initiative being taken at the local or municipal level for their repair or rehabilitation. The leasing initiatives of these structures should help better management of these water resources in order to make the water and the goods it provides more sustainable. The municipal project management in the sector is increasingly eluding local authorities, especially with the latest ongoing reforms of local territorial administration, which confer a large part of the powers of municipalities on agencies.

## **4. DISCUSSION**

According to Smets [23], the right of access to tangible and intangible water resources became an important topic at the international level during

the World Water Forum in Mexico City in March 2006 when the ministers present discussed it. If for Desbois [24], the 5th World Water Forum held in Istanbul in March 2009 made it possible to draw up an inventory essential to understanding the international issues raised by the question of water, it has only recorded few political progresses that could limit the tensions weighing on this vital resource. In addition, the author also asserts that regulations have ceased to be the only lever of public action: they tend to be supplemented by incentive devices which, rather than prescribe (irrigation quotas, maximum doses of fertilizer) or penalise (taxation of water withdrawals, fertilizers, pesticides), will generate support by relying on regulation (implementation of volumetric meters), ownership or payment of ecosystem services provided.

According to Baron and Tidjani [25], in political speeches, water represents a major political issue. Most African countries (Benin, Cameroon, Niger, Senegal) and others (Burkina Faso) have embarked on reforms for optimal and secure management of water resources and ecosystem services that arise from it [26]. Thus, several texts of laws are voted and promulgated in order to better regulate the management of water resources and natural ecosystems. However, these various texts are little known because of their low vulgarisation. In fact, legal texts are written in French while the beneficiary populations are nearly 70% illiterate in Benin [27].

According to Bernard [28], the actions resulting from territorial projects are implemented with co-financing from the municipality, as part of a project management. The analysis of the ecosystem governance system in rural Benin hence reveals three levels of regulation: (i) the national level with the intervention of the State, particularly in national planning, regulation of the sector and technical support, financial and organisational to village communities. (ii) The municipal level; the local authority assumes one of the competences that it shares with the State within the framework of decentralisation and (iii) the community level with the greater role of the communities which in solidarity set up regulatory mechanisms based on social and solidarity standards. We note in the field, a low propensity of municipalities to innovate in order to make available the water resource and the services it generates to the populations. Contrary to the ideas of Midgley and Dowling [29], municipalities make very few innovative decisions independent

of central state actions to protect water resources and make available the ecosystem services they generate for the benefit of communities.

According to Godet [30], territorial innovativeness should encourage a new response to the problem and / or to a need identified collectively in a territory with a view to improving well-being and sustainable development. In this situation, local authorities should make their contribution by developing initiatives aimed at community mobilisation to safeguard disappearing ecosystem services for the well-being of communities.

For Berkes and Davidson-Hunt [31], various traditional practices resemble the scientific processes used today to manage ecosystems. Management by succession, the division of the landscape into plots, crop rotation and polyculture are some of these practices suggested by the authors. From an ecological point of view, all these succession management systems have in common that they set up renewal cycles triggered by a disruptive event. Bied-Charreton, *et al.* [32] said that the arguments presenting water as a globalised economic good are based on traditional economic analyses, for which the increasing scarcity of fresh water, a limited resource, calls for management by the market, with the definition of adequate prices that will guarantee the general interest and the provision of the resource in the long term.

According to Baron [33], the construction of the rules of access to water should therefore result from a compromise between the different decision-making spheres, embedded, and not empowered from one another. Hence, participation does not depend only on the local, proximity scale, nor would it be natural. If the local level is a starting point for the construction of participatory processes, the local cannot be decreed.

Territorial governance defined as the process of dynamic articulation of all practices and institutional arrangements between geographically close actors in order to solve a productive problem or carrying out a development project". Gilly and Wallet [34], remains the most desired solution. Hence the need for a Public-Private partnership based on the way of acting, the consistency of the interventions and the mode of intervention of each actor for the purpose of the sustainable

development of the ecosystem services of water resources.

## 5. CONCLUSION

The legislative and institutional framework for water resources management in the Republic of Benin is sufficiently provided. Indeed, several legal texts organise and guide the management of ecosystem services of water resources in the Republic of Benin. The Law No. 87-616 of September 21, 1987 establishing the Water Code in the People's Republic of Benin lays the foundations for other legislative and legal provisions. For the most part, these laws comply with international and regional agreements in the sector and which Benin has ratified. This legal basis defines the conditions for the usages of ecosystem services and organises their governance for optimal and inclusive management for the benefit of all the stakeholders. These institutions also take into account most of the principles of sustainable management of natural resources developed by Ostrom [14]. However, several difficulties of their implementation and their respect by the communities persist. Indeed, the implementation texts of most laws are often not developed, and where they are, they are not widely known by the local communities mostly not formally educated. There is also a mismatch between adopted legal rules and ancestral cultures and customs. Finally, we note the existence in the laws of contradictions, ambiguities and overlapping responsibilities that raise conflicts of roles and responsibilities among the institutions in charge of their governance. More efforts should be made to inform local communities living with and depending on these resources of the rules to ensure their respect.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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