



Improving legal grounds to reduce vulnerability to coastal flooding in Morocco – A plea for an integrated approach to adaptation and mitigation



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1. Introduction

In Morocco, climate change will have significant effects on the coastal zone (Snoussi et al., 2008) regarding its extent and essential role in the Moroccan economy. The Moroccan coastal area stretches over 3500 km length. The recently adopted coastal law¹ provides that the coastal zone is composed by a terrestrial part that corresponds to the maritime public domain² and a maritime part of 12 maritime miles (article 2-1). More than 9.5 million people occupy the coastal cities of Morocco and this number is steadily growing. In 2015 it is expected that 55% of total population will live in the coastal zone, with rural population living increasingly on the coast due to poverty and rural exodus. Since 2000, the coastal zone generates about 82% of industrial output, 54% of tourist units and

71% of the banking business (HCP, 2010). Whereas these economic activities generate important revenues for the country, they also lead to the destruction of many coastal ecosystems, especially due to sand exploitation, urbanization, marine pollution and salt intrusion (Nakhli, 2010). A 2005 survey by the Ministry of the Environment revealed that nearly 270 species are endangered and others have completely disappeared (Ministry of the Environment, 2005). Many beaches are eroded and urbanized (Laouina, 2005), decreasing their aesthetical and recreation value and increasing risk to coastal floods. This environmental degradation and related loss of ecosystem services has a cost, which is estimated at about 3.166 million dirhams (MAD), ie 4.6% of GDP (METAP, 2006). However, this cost does not take into account climate change, which will exacerbate the vulnerability of the Moroccan coastal zones (Tekken et al., 2009) to coastal flooding due to sea level rise. The highly populated and economically important coastal zones are also increasingly vulnerable for threats related to climate induced changes in water quality and supply.

This paper argues that whereas the Moroccan government is increasingly aware and recognizes the vulnerability to climate change of important parts of its coast, this awareness is not translated into a balanced and coordinated policy response aiming at reducing coastal vulnerability through an integrated strategy for mitigation and adaptation. The coastal vulnerability is also seen in a narrow perspective related to sea level rise (Idllalène, 2013). Perception of impacts of climate change on coastal zones seems even paradoxical when comparing the map of vulnerable coastal zones with the tourism expansion area promoted by the development policy (see Fig. 1).

In the second national communication to the United Nations Framework Convention on Climate Change (UNFCCC) secretariat,³ the Moroccan government identifies its coastal zone according to

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¹ Official Bulletin no 6384 of 6 August 2015.

² The maritime public domain is defined by the Dahir of 1st July 1914 on public domain as: “the bank of the sea until the limit of the highest tides, as well as an area of 6 m measured from this limit, natural harbors, ports, harbors and their outbuildings, lighthouses, lamps, beacons and generally all the works intended for the lightening and for marking of coasts and their outbuildings” (personal translation).

³ The United Nations Framework Convention on Climate Change (UNFCCC) was adopted at the United Nations Conference on Environment and Development in June 1992. The text of the Convention is available at: https://unfccc.int/essential_background/convention/items/6036.php Morocco has ratified the Convention on December 28th, 1995. Official Bulletin No. 5000 of May 2d, 2002.

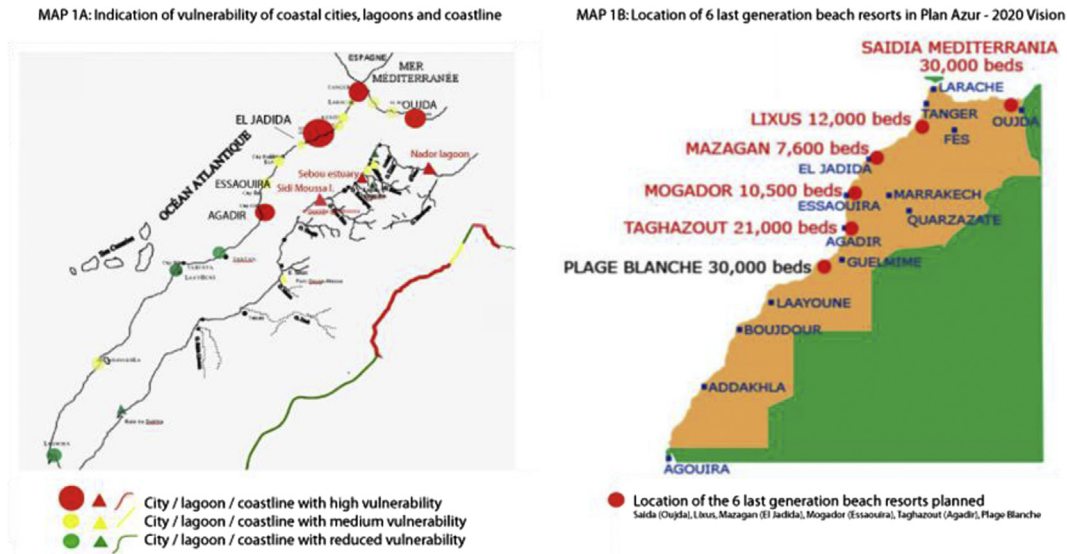


Fig. 1. Government's perception of coastal vulnerability.

Source: Map 1a: adapted from 2nd national Communication to the UNFCCC, 2010, Map 1b: adapted from Global Property guide online (<http://www.globalpropertyguide.com/Middle-East/Morocco/Price-History>).

their degrees of vulnerability to sea level rise. The Nador lagoon, Sidi Moussa lagoon, Sebou estuary and the cities of Casablanca, Mohamedia, Agadir, and Tangier were identified among the most vulnerable coastal systems to climate change induced sea level rise in Morocco (Royaume du Maroc, 2010: 44, Fig. 1a). At the same time however, the government authorizes a major expansion of tourism plans on the coastal zone, including vulnerable areas. Fig. 1b shows the localization of beach resorts sites in coastal areas established in the framework of the Azur Plan – 2020 Vision. If we superimpose those two maps, it will lead us to admit that the government has a double perception of coastal management and coastal vulnerability.

In fact, the coastal vulnerability does not seem to be part of development policy nor climate policy. Indeed, the new climate policy in Morocco is specifically oriented towards mitigation, while to overcome the coastal vulnerability to climate change, efforts should focus on adaptation strategies as stated by the UNFCCC and the Intergovernmental Panel on Climate Change (IPCC) for developing countries. Those adaptation strategies should be based on realistic scenarios of SLR threats at the local and regional scale. The reason being that effectiveness of mitigation and spatial location or scale of effects will not be known for many decades.

The IPCC (Nicholls et al., 2007) defines adaptation as an “adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities”. Mitigation, as the other strategy to fight against climate change, is defined in article 2 of the UNFCCC as “... stabilization of greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system ...”.

As provided by the UNFCCC and the IPCC, mitigation is a primary obligation of developed countries or so-called annex 1 countries (Ayers and Huq, 2008). In fact, according to the “common but differentiated responsibility” principle included in the text of the UNFCCC (Article 4), developing countries do not have the same requirements in terms of reducing GHG emissions as developed countries (Article 4 para. 2.a). Indeed, given their historical

responsibility for GHG release, developed countries are required to reduce their emissions as the main vulnerable to climate change impacts are the developing countries (Mertz et al., 2009). Thus, the principle of article 4 assigns them the means to mitigate the impacts of climate change in particular by ensuring technology transfer and the establishment of dedicated funds for adaptation (Najam et al., 2003). The Kyoto Protocol⁴ provided a first commitment period during which only developed countries are required to reduce their GHG emissions.⁵ Therefore, “GHG mitigation continues to be thought of as mainly the responsibility of highly industrialized nations, adaptation has meanwhile been framed largely as a developing country issue”. (Farrell, 2010:13).

While adaptation is clearly linked to coastal areas as provided in the UNFCCC and detailed by IPCC experts (see Fig. 2), the link between mitigation and coastal areas is not obvious. Indeed, mitigation has no direct or immediate impact on coastal zones (Toll, 2007), especially taking into account that effects of climate change on coastal zone are unavoidable (Nicholls, 2011, p. 151). Thus, there are serious risks that cannot be addressed by mitigation in the short term.

According to the IPCC, coastal adaptation is classified into the

⁴ Adopted at the third Conference of the Parties to the UN Framework Convention on Climate Change in 1997 and entered into force on 16 February 2005, the Kyoto Protocol sets reduction targets obligations of reducing emissions of greenhouse at least 5% compared to 1990 levels in the commitment period 2008–2012 and for the countries of Annex 1 (developed countries). The text of the Protocol is available at: <http://unfccc.int>/The Kyoto Protocol was ratified by Morocco on December 11th, 1997. Dahir No. 1-01-333 of 3 April 2002 on the publication of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, Official Bulletin No. 5122 of Thursday, July 3rd, 2003.

⁵ Since the Conference of the Parties (COP) to Kyoto Protocol, in its fourteen session held in Poznan (Poland) from 1 to 12 December 2008, debate is oriented towards the involvement of developing countries in the mitigation effort taking into account that according to statistics, by 2020, developing countries contribute in a major way to the greenhouse gas emissions (Streimikiene and Girdzijauskas, 2009: 136). In its seventeenth session (Durban, from 28 November to 11 December 2011) the COP invited developing countries to communicate information on their nationally appropriate mitigation actions (NAMAs). NAMAs aimed at achieving a reduction in emissions relative to “business as usual” emissions in 2020.

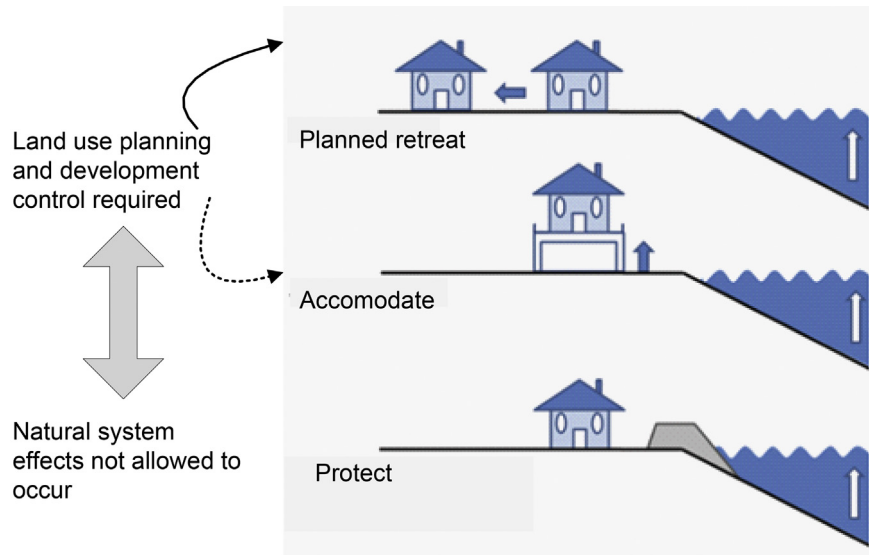


Fig. 2. Typologies of coastal adaptation to sea level rise.
Source: Adapted from Nicholls, 2011.

following categories: planned retreat, protection and accommodation (Klein et al., 2007, 2013; Mani et al., 2008, Fig. 2). Those strategies are mainly focused on sea level rise impacts. Climate change impacts other than SLR, such as changes in water quantity and quality would need different measures to adapt. The Moroccan government reiterates the IPCC typologies of coastal adaptation, while recognizing that the climate change impacts on coastal zone are various (Idllalène, 2013).

The three tactics cited above are mentioned by the NPAGW (Royaume du Maroc, 2009) but are not adopted as an integrated strategy with clear objectives and time frame through for example the formulation of an integrated coastal zone management plan. The new coastal law adopted in August 2015 does provide coastal plans, but those plans are not designed yet. Their adoption depends on regulations that cannot be enacted until two years after the publication of the law and remains to be seen. Besides mitigation, whose correlation with coastal adaptation is not well established in the NPAGW, is the strategy that is most used by the government.

Thus, for example, the concept of coastal adaptation is not provided by the new coastal law⁶ while mitigation is, although it is not yet an obligation to do so at international level. The purpose of this paper is first, to explain the issue of the lack of coastal adaptation under Moroccan law. Secondly authors analyze how the emphasis on mitigation creates a discrepancy in the implementation of the NPAGW. Finally, taking into account this discrepancy, this paper aims to identify possible correlations between the mitigation and adaptation strategy of coastal areas as an opening to contribute to a coordinated response to climate change induced coastal vulnerability in the future.

2. Material and methods

This study is based on the analysis of relevant legislation on climate change, specifically in terms of mitigation and adaptation targeting the coastal areas of Morocco (Law No. 13 -03 on the fight against air pollution, law No13-09 on renewable energies, Law no

11-03 on protection and enhancement of the environment, Framework law n° 12.99 on the National Charter on environment and sustainable development, law n°12-81 on coastal zone, etc.). The study is also based on the analysis of the two reports sent by Morocco to the UNFCCC Secretariat (the first in Octobre 2001 and the second in 2010),⁷ on the National Plan Against Global Warming (MEMEE, 2009) and on the Moroccan policy on climate change (MEMEE, 2014). The NPAGW is an official document containing measures to be taken by the government in order to fight against climate change effects through mitigation, adaptation and transversal measures. This Plan was reinforced by the Climate Change Policy in Morocco, which is an official strategy that reiterates the NPAGW content and adds further developments specifically on funding of the climate change policy (MEMEE, 2014). The international and comparative law and literature on climate change help to better apprehend the issue of balancing mitigation and adaptation strategies.

3. Results

The abundance of texts for the purpose of mitigation in comparison with the lack of texts on adaptation, especially in the field of coastal adaptation in Morocco, is documented and analyzed. Since the government focuses its climate change policy on mitigation, it is important to explore the possible co-benefits of the mitigation policy for vulnerable coastal zones.

4. Discussion

4.1. The lack of structural foundations of coastal adaptation under the Moroccan law

Developed in the wake of the United Nations Conference on Environment and Development (UNCED), the new generation of Moroccan environmental laws has not yet integrated the concept of coastal adaptation to climate change. While this gap can be justified

⁶ The new Coastal Law provides that coastal plans must take account of climate change. But it does not mention the concept of coastal adaptation (articles 3 and 6).

⁷ Those two reports are available at http://unfccc.int/national_reports (accessed in September; 9th, 2014).

by the lack of interest that the text of the United Nations Framework Convention on Climate Change (UNFCCC) gave to adaptation at the time of its formulation (Schipper, 2006), it remains that the founding concepts of international environmental law enshrined in the UNCED (precautionary principle, integration, ecosystem approach, adaptive management, etc.) are not well incorporated into the Moroccan environmental law. Indeed, the Moroccan legislator makes a selection in the integration of the UNCED principles.⁸ This selectivity is probably due to the desire to ensure the effectiveness of the law and thereby balancing the aspiration to be in harmony with the international law and the conscience not to make a radical break with existing laws. Indeed, the integration of all UNCED environmental legal principles might seem somewhat too ambitious for the new Moroccan environmental policy.

Thus, the concept of integrated coastal zone management (ICZM) yet enshrined in Chapter 17 of Agenda 21 and considered as a prerequisite for adaptation (see below), had no legal definition under the domestic law, until August 2015, even if Morocco ratified the Protocol of the Barcelona Convention on ICZM⁹ (see paragraph 1–2).

4.1.1. The new legal status of the coastal zone

In Morocco, laws applied to the coastal zone are historically incidental and still insufficient (planning, forests, public domain, environment, protected area, etc.) (Idlilalène, 2009). Though some of these more sectoral laws (law on water, National Charter on environment and sustainable development¹⁰) call for the adoption of a coastal law, this text has been slow to emerge.

The first bills on the coastal zone date back to the mid 1980s when the phenomenon of coastal development “littoralisation” was being criticized by its authors (Sakrouhi, 1994). But the various versions of these bills have failed to be adopted. Since the early 2000s, new coastal management plans, pilot projects of the Mediterranean coastal zone, gave place to new versions of the coastal bill, which now adopts the concept of integrated coastal zone management. In July 2010, the council of Ministers, chaired by the King Mohamed VI, finally approved a bill on the protection, management and development of the coastal zone. Since then, the bill has been withdrawn from the parliament by the new government. After a new tour of consultations by ministry departments, the modified bill was discussed in the House of representatives in the Moroccan parliament. The house of councilors then submitted it to the opinion of Economic, Social and Environmental Council (Conseil Economique, Social et de l'Environnement) in October 2014. The opinion given by the Council in December 2014 pointed at the lack of provisions on coastal adaptation in the coastal bill.¹¹ Finally,

the coastal law was published in the Official Bulletin on the 6th of August 2015. The delay in enacting a law specific to the coastal zone in Morocco could be explained by many reasons. The most important reasons being the opposition by the real estate lobby and the feeble political will as the coastal zone is mainly seen as an opportunity for development.

Lacking a sound legal status, the coastal zone has been subject to incidental and sometimes conflicting policies (tourism/fisheries/forests) over the past decennia in the absence of a coordination body. The River Basin agencies play a role in coordination and planning on the basis of an ecosystem-based approach through the elaboration of master plans of water resources management. However, this role remains insufficient, both in terms of scope (focusing on water management) and actual coordination capacity on the ground. The latter relates to the myriad of actors and stakes in the highly productive coastal zones and the historic attention on provision of water for agriculture when considering water management and planning (Choukr-Allah, 2011; Van Cauwenbergh and Idlilalène, 2012). Furthermore attention for and knowledge of ecosystem-based approaches is limited in the recently established river basin agencies. As such there is no institution yet with both the mandate and the capacity to coordinate the various development strategies and responses to climate change in the coastal zone.

The historic lack of interest to protect the coastal area, *at least by some powerful stakeholders*, has resulted in the absence of an adaptation policy from which this coastal area could potentially benefit. However, within the new law, the coastal zone will benefit from planning schemes at national and regional levels. Those planning schemes will be “based on scientific, socioeconomic and environmental available data and on an integrated approach that takes ecosystems and climate change into account” (article 3 and article 6). Nevertheless, those planning schemes are not yet elaborated and need a period of two years minimum to be adopted (Idlilalène, 2014). And when adopted, the actual effect on the ground of coastal zone plans will depend on the degree with which these plans catalyze the diverse interests of stakeholders and coordinate mandates of diverse sectoral plans.

4.1.2. A timid legal recognition of the concept of integrated coastal zone management (ICZM)

ICZM is “a dynamic process for the sustainable management and use of coastal zones, taking into account at the same time the fragility of coastal ecosystems and landscapes, the diversity of activities and uses, their interactions, the maritime orientation of certain activities and uses and their impact on both the marine and land parts” (article Article 2 – f of the ICZM Protocol). In the context of Integrated Coastal Zone Management, ecosystem-based approach (EBA) is the basis for spatial planning. EBA promotes multi-sectoral approaches, integrates flexible management structures that enable adaptive management, minimizes tradeoffs and maximizes benefits with development and conservation goals (Andrade et al., 2011).

The definition of integrated coastal zone management under the Moroccan law is recent although a few scattered texts have been timidly referring to this concept. For instance, the 2003 law on the protection and enhancement of the environment (Loi sur la protection et la mise en valeur de l'environnement¹²) recommends the adoption of legislative and regulatory measures for the coastal zone. In the same way, the 1995 Water Act encourages in its

⁸ For example, Law on protection and enhancement of the environment adopted in 2003, included the principle of sustainable development, the principle of prevention, the polluter-pay principle, but not the precautionary principle. This principle has been incorporated into the legislation within the National Charter on environment and sustainable development enacted in 2014 (Framework law n° 12.99 on the National Charter on environment and sustainable development, Official Bulletin n 6240, march 20th, 2014). The principle coastal adaptation is not yet incorporated into the law, though the concept of adaptation is included into the National Charter on environment and sustainable development. The ecosystem approach is still absent in the laws even if the concept of ecosystem is integrated.

⁹ The Protocol on Integrated coastal zone management in the Mediterranean w Morocco signed the Protocol in January 2008 and ratified it in 2012 (Dahir No 1-09-251 of December 10th, 2012, Official Bulletin No 6228 of the February 6th, 2014), as adopted in Madrid in January 21st, 2008. It entered into force in March 24th, 2011. The text is available at: http://195.97.36.231/dbases/webdocs/BCP/ProtocolICZM08_eng.pdf; accessed September 23rd, 2014.

¹⁰ Framework law n° 12.99 on the National Charter on environment and sustainable development, Official Bulletin n 6240, march 20th, 2014.

¹¹ This opinion is available at: <http://www.ces.ma/Pages/saisine.aspx> (accessed February 10th, 2015).

¹² Law on protection and enhancement of the environment no 11-03 promulgated by the Dahir no1–03-59 adopted in May 12th, 2003.

preamble the adoption of a text on coastal management.¹³ The law on the protection and enhancement of the environment recognizes the need to fight against climate change effects. Moreover, the ratification of the UNFCCC and the Kyoto Protocol by Morocco proves that Morocco has accepted to be bound by their principles. The new national Charter on environment and sustainable development contains also a shy provision on adaptation (article 1).

Already in 1994, the IPCC stated that ICZM is the recommended framework to adapt to the impacts of climate change on coastal areas (Bower et al., 1994). In the same way, the Taipei guidelines on Integrating Coastal Management Programs and National Climate Change Action Plans (Cicin-Sain, 1997) aimed to help states to implement strategies for ICZM oriented to coastal adaptation.

The UNFCCC underlines that “all parties taking into account their common but differentiated responsibilities and their specific national and regional development priorities of their objectives and circumstances, undertake to establish appropriate and integrated plans for ICZM”(Article 4 -e).

In Morocco, the first national communication for the implementation of the UNFCCC¹⁴ emphasizes the need to integrate the coastal problem based on the results of some studies on the Moroccan coasts (eg: MATEE-PNUE, 2005; Snoussi et al., 2008). What matters, according to the UNFCCC document, is to enact a law that might limit the coastal vulnerability (to sea level rise) and clarify responsibilities in this area. It encourages also the adoption of an integrated coastal management strategy and promotes enhanced data acquisition (oceanographic data, tide gauge, topographic and bathymetric maps and charts). These measures should be undertaken in parallel with the development of an integrated research program.¹⁵ They also need to be coordinated into institutional arrangement (Malone et al., 2014¹⁶). The new 2015 coastal law defines the integrated coastal management as “a harmonious management of coastal areas, taking into account environmental, sociological, economical and institutional aspects and aiming to guaranty a balance between different coastal functions and their continuity” (article 2-2).

Coastal adaptation to climate change remains absent in the Moroccan law, at least as an explicit concept. However, the coastal law encourages adopting coastal planning schemes that take into account climate change. But meanwhile, the efforts, on the ground, of public authorities have so far focused on mitigation. Indeed, while mitigation is regulated by binding legal instruments, adaptation remained devoid of a specific legal tool, particularly concerning the coastal zone (see Fig. 3). The adoption of coastal plans which can impose adaptation measures, as provided by the new coastal law, is not yet a reality. But there is a great evolution. In comparative law, most coastal legislations do not address climate change. In Morocco the effectiveness of coastal adaptation measures still depends on regulations to be adopted in order to reinforce the coastal law.

4.2. The focus on mitigation overshadows coastal adaptation

Even if it has been argued that “Morocco is a developing country and is not intending to set binding emissions reduction targets at

either the national or the sectoral level in the short run” (Klein et al., 2014, 26), Morocco focuses its emerging climate policy on mitigation.

4.2.1. Mobilization for mitigation

An illustration of how only mitigation seems to draw the attention of the public authorities at political and legal levels is that in record time, three texts on renewable energy (see below) have been enacted, while the Coastal Law is expected since the mid-1980s and has only recently been approved (Fig. 3).

Since 2003, Morocco enacted its Air pollution Act¹⁷ which expressly refers to global warming (article 30). Article 31 requires the reduction of emissions of air pollutants, including greenhouse gases. On the basis of this article, the law on air protection extends its scope to “the prevention and the fight against emissions of air pollutants that can affect the health of humans, wildlife, soil, climate, cultural heritage and the environment in general” (article 2).¹⁸

The National Plan against Climate Change states that “given that GHG emissions are largely related to fossil energy consumption; mitigation of climate change should essentially focus on energy efficiency measures and renewable energy” (personal translation). Thus, according to this plan, “the mitigation [measures] in Morocco [should be taken in] the sectors of energy, transport, industry, waste, agriculture, forestry, construction. They are based fundamentally on the Strategy on Energy launched in 2008” (personal translation).

This strategy is first dedicated to overcome the strong dependence on fossil energies. It then aims to reduce the environmental impact of greenhouse gas emissions which are 60% energy-related (Berdai, 2007).

As part of this strategy, Morocco launched in November 2009 its integrated project on solar energy.¹⁹ It will save the country annually the equivalent of 1 million tons of oil and prevent the emission of 3,7 million tons of CO₂²⁰.

Morocco plans indeed to achieve 42% of renewable energy by 2020. To this end, the Parliament adopted a new law in February 2010 on renewable energy.²¹ In addition, two other texts respectively establishing a national agency for the development of renewable energy²² and solar energy society “Moroccan Agency for Solar Energy”²³ were adopted.

The law on renewable energy aimed at ensuring sustainable development by promoting renewable energy, strengthen the competitiveness of the productive sectors of the country, preserving of the environment through the use of clean energy technologies for the limitation of greenhouse gas emissions and reducing the high pressure on forests” (preamble of the Act²⁴).

Accordingly, Morocco is a forerunner country under the “Union

¹⁷ Dahir No. 1-03-61, May, 12th, 2003 promulgating the Law No. 13 -03 on the fight against air pollution, Official Bulletin No. 5118, June 19th, 2003.

¹⁸ Article 2 personal translation.

¹⁹ For more information, see <http://www.org.mamasen> (accessed September; 9th, 2014).

²⁰ Ministère de l'Énergie et des Mines, Projet marocain de l'énergie solaire, Moroccan Solar Energy project, 2009.<http://www.mem.gov.ma/Ministre/sommaire1.htm>.

²¹ Dahir No. 1-10-16, February 11th, 2010 promulgating the law No13-09 on renewable energies. Official Bulletin No. 5822, Mars 18th, 2010.

²² Dahir No. 1-10-17 promulgating Law No. 16-09 on the National Agency for the development of renewable energy and energy efficiency. BO No. 5822 of March 18th, 2010.

²³ Dahir No. 1-10-18 of February, 11th, 2010 promulgating Law No. 57-09 establishing the company “Moroccan Agency For Solar Energy” BO No. 5822, of March 18th, 2010.

²⁴ Personal translation.

¹³ Law No.10–95 on water: Official Bulletin No. 4325, September 20th, 1995.

¹⁴ Ministère de l'Aménagement du Territoire, de l'Urbanisme de l'Habitat et de l'Environnement, Communication nationale initiale à la convention cadre des Nations Unies sur les changements climatiques, Octobre 2001, 101 p. This report is available at http://unfccc.int/national_reports (accessed September; 9th, 2014).

¹⁵ *Ibid.*, p. 101.

¹⁶ Malone et al. argue that the primary challenge to sustained development of a global scale coastal ocean observing system that would provide the data needed for Ecosystem based management is not technical but political and institutional.

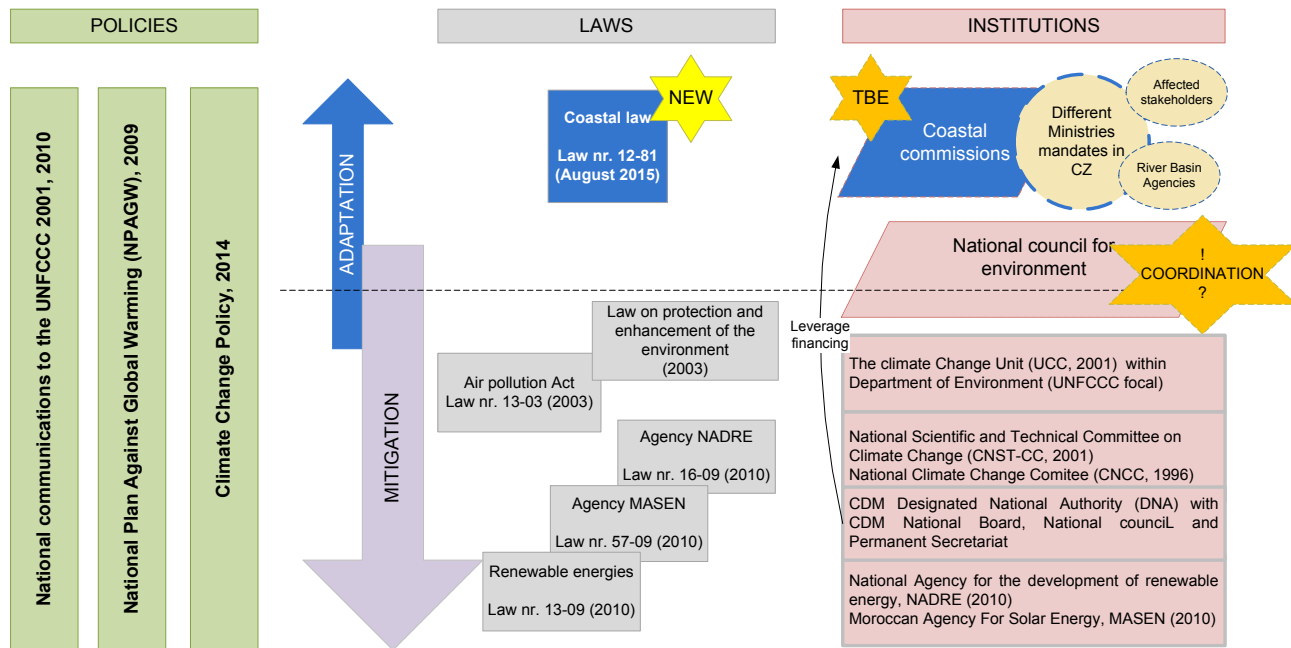


Fig. 3. Mitigation and (coastal) adaptation in the Moroccan climate policy: overview of policies and laws in the past decennia and institutions involved. The Coastal commissions provided in the new coastal law are to be established.
Source: Own elaboration.

For the Mediterranean Solar Plan” (Struyve, 2006; Agueniou, 2009), since it presented the largest number of projects of the Clean Development Mechanism (CDM) compared to other Mediterranean countries. Morocco is also ranked 4th in terms of registered CDM projects, with 14 projects which have a total emissions reduction potential of 2.4 MtCO₂e per year (Klein et al., 2014, p. 23; Grant, 2011).

Conceived in the frame of Kyoto Protocol, CDM allows industrialized countries to finance projects that reduce or avoid emissions in developing countries. In return, they are rewarded with credits that can be used to meet their own emissions targets. Under this system, developing countries recipients receive complimentary advanced technologies. All this at low cost and generate higher profits.²⁵

Since the ratification of the Kyoto Protocol by Morocco in 2002, the country was quick to develop a CDM Designated National Authority (DNA) responsible for both the regulation, promotion and monitoring of international negotiations on CDM. It has also developed a national strategy to promote investment through the CDM (Royaume du Maroc, 2004).

The CDM mobilizes various structures such as the National Board of the CDM (CDM NC) and the Permanent CDM Secretariat, the National Agency for the development of renewable energy and energy efficiency and the Moroccan Agency for Solar Energy above mentioned.

Moreover, Morocco has explored different other mitigation instruments such as **Nationally Appropriate Mitigation Actions (NAMAs)** and the UNFCCC new market-based mechanism (Klein et al., 2014, p. 23).

It is precisely this paradox in addressing climate change issue in Morocco (on one hand enthusiasm for mitigation mechanisms and on the other hand inertia about the necessary measures for adaptation) that raises doubts on the political motivation to implement

a targeted legal framework for coastal adaptation.

4.2.2. Why coastal adaptation is not going as fast as mitigation?

The focus on mitigation policy reflects the belief that addressing the problem at its source will minimize the need to adapt. It also reflects inertia associated with achieving needed changes in the social, economic and political fabric of the country in order to adapt.

Aside from the financial opportunities they offer (De Arce et al., 2012), the flexibility mechanisms (such as CDM) are relatively less complex²⁶ to implement than the adaptation measures. Adaptation requires fundamental reforms affecting many public policies (social, environmental, industrial, urban planning, etc.). It also necessitates profound legal reforms in order to provide prerequisite for coastal adaptation (see Table 1). Taken together the inertia associated with achieving the needed social and political changes helps to explain why adaptation has taken a back seat to mitigation.

Indeed, adaptation “has more immediate synergy with development” (Ackerman F. 2009: 5) and necessitates strong political efforts to be achieved. Moreover, adaptation is uncertain, regarding its costs on the contrary to mitigation (McKibbin and Wilcoxon, 2004). Thereby, “on the macroeconomic perspective, it has been suggested that climate change mitigation may even have a growth stimulating effect in many countries, and that with appropriate environmental and industrial policies developing economies may share in the years and decades ahead in these gains” (Ackerman, 2009).

However, “a failure to invest in adaptation measures will lead to much greater additional damage than will be the case under the [mitigation]. As such, mitigation can be regarded as a strategy to reduce the risk of uncertain damage, as well as a failure to optimally

²⁵ http://unfccc.int/portal_francofrone/essential_background/feeling_the_heat/items/3297.php (accessed September 9th, 2014).

²⁶ It has been argued (Kothes and Brouds, 2006: 13) that CDM in Morocco presents some difficulties to be implemented for instance: the CDM project cycle is quite long, the transaction costs are high, the evidence of the additionality criterion is difficult to establish, the language used (English) is difficult to access for francophone countries.

Table 1
Divergences between mitigation and coastal adaptation in Morocco.

	Coastal adaptation	Mitigation
Prerequisite	A new coastal law that provides a framework for reforming the legal statute of the coastal zone. The ICZM principle included into the coastal law. But fundamental legal reforms still needed (<u>Urban planning</u> law, maritime public domain, marine environment, etc.)	Various existing legal texts (see Fig. 3)
Tools	Potential of Coastal Plans. (but depending on enacting regulation that operationalises the coastal law, not before 2017)	Technologies can be brought by the Clean Development Mechanism (CDM)
Stakeholders	All authorities which intervene in the coastal zone and those affected by the process of coastal adaptation. The coastal law provides a Coastal Commissions (regional and national levels) Scope for stronger role for private sector and civil society	Targeted and structured stakeholders (see Fig. 3)
Costs	Uncertainty of costs CDM as main source of income for UNFCCC Adaptation fund for funding of adaptation in developing countries with high vulnerability (Morocco not supported yet)	Can be funded by CDM
Effects	Short to medium term activities with both short/medium and long-term persistent effects	Long term (but effects on coastal zone are not certain, spatial link uncertain)

invest in adaptation". (Hof et al., 2014: 16).

What reinforces the absence of coastal adaptation in the climate change policy is the divergence of stakeholders (see Fig. 3). Mitigation is part of a completely different institutional mechanism from that which could manage coastal adaptation. Typically, stakeholders in mitigation are the Department of Energy and entities dedicated to renewable energy.

Institutions in charge of mitigation in Morocco are:

- The National Climate Change Comitee (Comite national sur les changements climatiques (CNCC) created since 1996,
- The National Scientific and Technical Committee on Climate Change (Comité National Scientifique et Technique sur les Changements Climatiques- CNST-CC) created in 2001
- The climate Change Unit (Unité Changements Climatiques – UCC) created in 2001 within the Department of Environment. This unit is the UNFCCC national focal point and works with other institutions such as the National Meteorology Directorate (Direction de la Météorologie Nationale – DMN) which is the IPCC focal point (Klein et al., 2014).

On the other hand, stakeholders who could get involved in coastal adaptation are typically responsible for the management of maritime biodiversity and land cover and land and marine use (River Basin Agencies, Department of Agriculture, Department of Fisheries, Department of Tourism, Department of urban planning, etc.). Besides the myriad of government institutions, stakeholders to include in the debate on and elaboration of coastal zone adaptation measures are the private sector and civil society at large. Involvement of the latter is particularly important and should address those that are likely to be directly impacted (positively and negatively) by the actions taken to adapt.

Certainly, the National council of Clean Development Mechanism (CDM) encompassing all the departments, including those working on coastal zones, could facilitate an adaptation policy, but this institution does not set policy links between the CDM and coastal management.

Even if public authorities want to incorporate the coastal zone in the climate policy in the medium term (as it is stated by the National Communications to the UNFCCC and in the national Plan Against Global Warming (NPAGW)), this area will not respond rapidly to mitigation. Indeed, the response of sea-level rise to mitigation of greenhouse gas emissions is slower than for other climate factors (Meehl et al., 2012) and mitigation alone will not stop growth in potential impacts (Nicholls and Lowe, 2006), nor has mitigation the potential of targeted spatial response in the near term offered by adaptation.

Therefore, a coastal adaptation policy remains an urgent measure to be taken. How then could the mitigation strategy help to initiate this policy?

4.3. Could the mitigation policy lead to a coastal adaptation strategy in the future?

The mitigation strategy, through flexibility mechanisms, could help to create a dynamic for stimulating adaptation. Through its participation to the UNFCCC conferences of the parties (COPs), Morocco expressed his willingness to adopt a coastal adaptation policy (First and second national communications, NPAGW). Indeed, "The activities implemented since ratification of the UNFCCC have been used as building blocks for the preparation of a Climate Change Policy (Politique du changement climatique au Maroc, PCCM), which is currently being developed" (Klein et al., 2014, p. 22). The PCCM includes the National Plan against global warming, and more recently "a process to prepare strategic climate change guidelines" that will help to provide a National Vision for 2030.

The PCCM will be based on two principles: "i) decoupling economic growth from GHG emissions, particularly through the use of clean technologies; and ii) preserving the country's territory and ecosystems in the most appropriate manner, by responding effectively to national vulnerabilities and by developing an adaptation policy that will prepare the general population and economic stakeholders to address those vulnerabilities" (Klein et al., 2014, p. 22).

Moreover, although it is not expressly linked to coastal areas, the concept of adaptation appeared in a timid way in the Framework Law for the National Charter of the Environment and Sustainable Development adopted in March 2014.²⁷

In addition, "reviews are underway to evaluate the adequate options for the implementation of a new institutional framework for climate change, aligned to the new sustainable development governance required by the Framework Law for the CNEDD" (Klein et al., 2014, p. 23).

The Department of Environment may, as an institution of coordination, and to the extent that it also elaborates the coastal bill, help connect both mitigation and adaptation policies on the coastal zone. Accordingly, the Moroccan Second National Communication to the UNFCCC announced that "the action for adaptation, like any public policy should consider mitigation to exploit synergies, resolve contradictions, to ensure a good understanding of the

²⁷ Framework law n° 12.99 on the National Charter on environment and sustainable development, Official Bulletin n 6240, march 20th, 2014

action by communities” (Morocco, 2010: 104). To this end, it recommends that adaptation “[should benefit] from a clear analysis in terms of sustainable development that must take into account multiple objectives: social, economic, and environmental, in an often adversarial context”.

In fact, with many differences but also synergies (Luisetti et al., 2011),²⁸ adaptation and mitigation should be integrated into development policy to better combine their effects. This is also what provides the IPCC (Klein, 2002). However, focusing on possible synergies between adaptation and mitigation can have adverse results to the extent that it could lead to a large institutional complexity, given the difference of the actors involved. This could also increase costs because uncertainties about the potential synergies remain (Klein et al., 2005).

Therefore, optimal combination of these two strategies should be to integrate them into development policy, given the strong links between the strategy of climate change and sustainable development.²⁹ Indeed, climate change has an obvious impact on the economy as the fight against climate change effects depends on the “responsiveness” or the capacity to adapt which in turn depends on the level of development (Tompkins and Adger, 2005). To reach an optimal combination, the authors suggest the concept of “mainstreaming” by integrating policies and measures against climate change into development planning and in decision making, to ensure the sustainability of investment and reduce impacts for development (economic vulnerability) (Ayers and Dodman, 2010: 164).

To make the combination of mitigation and coastal adaptation operational, the NPAGW should allow coastal zones to benefit from funds drained by the CDM. Indeed, at the international level, the Adaptation Fund is powered by a 2% levy on carbon credits generated through the CDM (Murphy et al., 2009: 15). These funds will benefit in turn to states according to their needs. It means for those states, particularly developing countries, to demonstrate their rights to benefit from the fund. In fact, the UNFCCC provides a limited list of categories of states with vulnerable coastal zone to climate change. As such, in its second communication to the UNFCCC, Morocco highlighted the lack of information on coastal vulnerability studies and urges to develop scientific research in this field in order to demonstrate a potential need for support from the Adaptation Fund³⁰. Indeed, only a few scattered studies targeting the Moroccan Mediterranean coastal zone analyze the vulnerability of this area (Morocco, 2010: 118). In order to address the challenges faced by the Moroccan coast, a broader study and assessment on how mitigation and adaptation can be combined is needed.

The coastal Plans advocated by the new Coastal law can be mobilized to this goal. Those plans, as cited above in Section 4.1.1, will indeed be based “on the most recent relevant scientific data and adopt an integrated and ecosystem approach to coastal

management” (Article 3). In fact, effective ecosystem-based approaches have the potential to provide cost-effective opportunities for addressing the multiple and often conflicting goals of socio-economic development and environmental sustainability in a synergistic manner (Malone et al., 2014).

The Local Agenda 21³¹ and the National Initiative for Human Development (INDH)³² may also accompany the climate strategy by focusing on adaptation measures as “no regret” measures.

The Ministry of the Environment, through its coordination mission, should monitor the integration of adaptation and mitigation. The National Council of Environment, which is a part of the Ministry, should take the lead by coordinating the coastal policy and integrate the climate change component. Coastal pilot plans are yet to be mobilized for this purpose. They are an opportunity for the coastal population to contribute to the adoption of the Coastal Plan (CAP Nador Plan for example³³). However, their role is still limited in the absence of a real leadership by the Ministry of the Environment.

From this perspective, Moroccan climate change policy appears to be an opportunity for the coastal area as it places it in the context of sustainable development and could in turn motivate the adoption of an integrated coastal management policy. This is what emerges from the second national communication stressing that prior to any adaptation policy remains the integrated coastal management “which is an essential tool for sustainable development of the Moroccan coasts” (Morocco, 2010: 120). In this way, the adoption of a coastal law “to mitigate and slow down the degradation of the coastal environment on the one hand and to clarify the responsibilities of the various authorities involved on the coastal zone on the other hand” is an important step towards coastal adaptation (Morocco, 2010: 119).

5. Conclusion

This article reviews the legal and policy framework to address coastal vulnerability in Morocco. In spite of being a developing country, Morocco has focused its attention in climate policy and measures on mitigation, with a large number of projects under the Clean Development Mechanism. Coastal adaptation is however urgent in Morocco, with 3500 km of coastline subject to adverse climate change impacts and large parts of its economy based on coastal activities. The recently adopted coastal law provides a timid framework for coastal adaptation, however adaptation is not mentioned explicitly in the text and the law needs to be translated into operational regulations and implementation on the ground. The complexity of adaptation calls for a broader composition of the institutions and sectors involved, as compared to mitigation. Against a background of inertia for the needed changes in the socio-economic and political fabric entailed by coastal adaptation, combined with a feeble political will to protect the coastal zones, the translation of the new coastal law into meaningful regulation and effective coastal adaptation will need strong political will and mandate. Furthermore leadership from the Ministry of Environment is needed to coordinate the coastal policy and integrate the climate change component. It is argued that the efforts on the mitigation strategy could help to create a dynamic for stimulating adaptation as leverage can be found in financing adaptation from the CDM fund.

²⁸ Luisetti et al. argue that salt marshes provide natural coastal defense and are effective carbon sink. Urban adaptation, (green infrastructure) can also contribute to mitigation through avoided emissions and carbon storage.

²⁹ New Delhi Declaration on climate change and sustainable development. http://unfccc.int/cop8/latest/1_cpl6rev1.pdf (accessed September 9th, 2014).

³⁰ Up to 2011, Morocco did not receive any support from the Adaptation Fund (OECD, 2011).

³¹ Local Agenda 21 are programs of capacity enhancement launched in 1995 according to the Chapitre 28 of Agenda 21 adopted in the framework of the United Nations Conference on Environment and Development (UNCED). This program tend to promote the good urban governance by assisting local authorities to elaborate and implement participative environmental action plans. In Morocco, this program exists in the following cities: Essaouira, Méknes, Marrakech, Agadir and Ouarzazate. Information on Local Agenda 21 in Morocco is available at: <http://www2.unhabitat.org/programmes/agenda21/moroccofr.asp> (accessed September 9th, 2014).

³² The NPAGW includes the national initiative for human development (INDH) as a transversal measure.

³³ <http://www.eucc.net/en/capnador/>, accessed 15 January 2015.

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