

# The Policies of Seismic Risk Management: Case of the Protected Areas of Dellys and Tenes Cities, Algeria

Farida Sehili and Said Madani

*Laboratory PUViT, University of Ferhat Abbas, El Bez 19000, Sétif Algeria*

**Abstract:** The greater part of urban heritage, especially of the medium and small Algerian cities, is subject to a major seismic risk. The probability of a happening earthquake is strong, and the territories vulnerability is great. Legislative procedures are implemented to support urban heritage and managing natural disasters. In fact, the PPSMVSS (permanent plan of safeguard and enhancement of saved sectors) as an instrument of protection, preservation and enhancement of this heritage, in its content, does not guide decision makers on how to manage the vulnerability of preserved areas from the earthquake. After the disaster of the earthquake that hit the Algerian Centre (wilaya of Boumerdes) in 2003. A legislative framework was created while other texts have been adapted. Emergency measures operations are launched to preserve the under threat monuments and protected areas. Saved sectors of Dellys, in the wilaya of Boumerdes and Ténès in the wilaya of Chlef, are all the time subjected to seismic risk. This article presents a comparative study of two PPSMVSS, Dellys and Ténès, and the management of the vulnerability of their two safeguarded areas. As a result of this study, some indicators were identified to allow the development of plans for the protection and management natural risks of these protected areas.

**Key words:** Safeguarded sector PPSMVSS, catastrophe, seismic risk, management.

## 1. Introduction

Algeria has a rich cultural and natural heritage stunning by its historical and symbolic significance, witnessed the passage of many civilizations. This is an invaluable archaeological, architectural and urbanistic variety.

Conservation and enhancement of this heritage were needed for Algerians particularly makers, for real cultural property. The strategy put in place to preserve the heritage has been since independence, in the identification and protection by filing or registration on an additional inventory, the various historic monuments and sites.

## 2. Tools to Protect Safeguarded Areas

After the promulgation of the law 98-04 of June 15, 1998 on the protection of cultural heritage, protective, safeguard and enhancement measures are implemented for each type of immovable cultural property. Urban

and rural groups are protected by creating conservation areas.

Articles 17 and 41 of the above mentioned law establish the criteria for historic monuments, safeguarded sector, urban and rural housing developments, such as Kasbahs, Medinas, Ksour, villages and traditional towns. The first is defined as any isolated or grouped architectural design that reflects a particular civilization in a significant development and a historic event [1].

Concerning urban and rural real estate, they must meet the following criteria: homogeneity, architectural unity, aesthetic unity, historical interest, architectural interest, artistic or traditional interest to justify the protection, restoration, rehabilitation and enhancement.

The folder concerning the creation and delimitation of saved sectors is published by decree. These areas feature a PPSMVSS (permanent safeguard and enhancement plan). It takes place in a POS (land use plan).

Since the promulgation of the law on the protection of heritage, seventeen conservation areas are created

---

**Corresponding author:** Farida Sehili, Ph.D. architecture student, research field: urban risk management. E-mail: sehiliFarida@gmail.com.

**Table 1** Status of saved sectors in Algeria.

Wilayas	Saved sectors	Number of pop.	Number of built	Establishing decree of the saved sectors
Algiers	Casbah of Algiers	55,000	2,200	No. 05-173 in May 9, 2005
Constantine	Old town of Constantine	35,000	1,164	No. 05-208 in June 4, 2005
Chlef	Old town of Ténès	1,360	300	No. 07-277 in Sep. 18, 2007
Laghouat	Old kzar of Laghouat	1,500	622	No. 11-141 in March 28, 2011
Bejaïa	Old town of Bejaïa	13,500	3,118	No. 13-187 in May 6, 2013
Biskra	Dachra El-Hamra	4,200	700	No. 13-185 in May 6, 2011
Tlemcen	Old town of Tlemcen	-	-	No. 09-403 in Nov. 29, 2009
Tlemcen	Old town of Nedroma	-	-	No. 09-402 in Nov. 29, 2009
Tizi-Ouzou	village Ait El Kaid	-	-	No. 09-405 in Nov. 29, 2009
Annaba	Old town of Annaba	600,000	-	No. 13-186 in May 6, 2013
Ouargla	Old ksar of Ouargla	8,000	2,300	No. 11-142 in March 28, 2011
Ouargla	Ksar of Témacine	-	-	No. 13-184 in May 6, 2013
Boumerdes	Old town of Dellys	2,867	633	No. 07-276 in Sep. 18, 2007
Ouargla	Ksar of Témacine	-	-	No. 13-184 in May 6, 2013
El Oued	Neighbourhood of Echeche and Messaaba	-	-	No. 11-140 in March 28, 2011
Mila	Old town of Mila	-	-	No. 09-404 in Nov. 29, 2009
Ghardaïa	Valley of M'Zab	181,263	39,916	No. 05-209 in June 4, 2005

Source: national agency of the saved sectors 2014.

and defined (Table 1).

### *2.1 The Contents of the Permanent Safeguard and Enhancement Plan of Conservation areas (PPSMVSS)*

The classified or inventoried sectors are protected by creation and delimitation. Once declared, they are covered by a PPSMVSS (permanent safeguard and enhancement plan of conservation areas).<sup>1</sup>

The content and the various stages of the plan are divided into three phases defined as follows:

- Phase 1: diagnosis and if necessary emergency measures project;
- Phase 2: historical and hippological analysis and draft of PPSMVSS;
- Phase 3: final drafting of permanent safeguard and enhancement plan of conservation areas.

The plan consists of a presentation report that highlights the current state of the conservation area and outlines emergency measures taken for its conservation and enhancement. The PPSMVSS is referring to the PDAU (director plan of management and urbanism),

and shows the following synthesized aspects: the frame of the conservation status, condition and layout of road networks, water supply and irrigation of disposal of rainwater and waste water; the removal and disposal of solid waste; the demographic and socio-economic aspect; economic activities and equipment; the legal nature of real estate and demographic and socio-economic perspectives and the proposed programs of public facilities.

The procedure fixes the general rules of land use and the constraints, as well as the operations under consideration within the framework of the development. The regulation should also include, as applicable, the content of Article 18 of Executive Decree No. 91-178 of May 28, 1991.<sup>2</sup> A plan for geotechnical constraints, a plan of servitudes and a plan on the conservation status specifying the degree, nature and the cause of buildings deterioration and undeveloped areas and other typological plans [2, 3].

It is particularly striking to note the general state of

<sup>1</sup>Executive Decree No.03-324 on October 5, 2003 laying down detailed rules of establishment PPSMVSS.

<sup>2</sup>Executive Decree No. 91-178 on May 28, 1991, amended and supplemented, laying down the procedures for the preparation and approval of land use plans as well as the content of documents relating thereto.

degradation of this heritage. Consolidation works, with their rows of scaffolding and shoring, are ubiquitous in urban landscapes.

While historic buildings are closed to the public for security reasons. This is the case of several monuments (Katchaoua mosque and the palace of the Dey) in the city alone Algiers (Fig. 1).

At this stage, the PPSMVSS do not point in its content, decision makers on how to manage the vulnerability of protected sectors from the earthquake.

### 3. The Seismic Risk Management Policies of Safeguarded Areas of Dellys and Ténès

Progressive loss of heritage assets, following natural hazards, alerted UNESCO (United Nations Educational, Scientific, and Cultural Organization) for the establishment of a manual to manage disaster risks for world heritage. Earthquakes cause huge losses to the heritage which plays important role in social cohesion and sustainable development [4, 5]. Faced with this situation, UNESCO set up a risk reduction plan related to natural disasters. Managers and heritage decision makers do not see the vulnerability of heritage as a priority until the advent of the disaster [6, 7].

After the disaster of the earthquake in Algeria in 2003, a legislative framework was established while other texts have been adapted to support this natural phenomenon.

There are several provisions on the prevention of major risks at different territorial and urban scales.

Table 2 highlights the gap between the measures to protect the cultural heritage property and the prevention of major risks.

The law No. 05-04 relating to the planning and urban planning with its executive orders, demands, in the development of instruments, to identify and classify seismic zones according to their degree of vulnerability and establish a map defining “areas exposed to natural and technological hazards, along with technical reports, as well as the major risks arising from general prevention plan”.

The delimitation of areas and exposed land to natural hazards is carried out according to the means of geotechnical and seismic micro-zoning, at the scale of the land use plan.

The areas and land exposed to natural hazards and/or technological, classified according to their degree of vulnerability, are transcribed on the land use plan as proposed by the services responsible for urban planning, territorial jurisdiction, in the same way that prevailed approval of the plan.

Following the amendment of the articles concerning the land use plan that came after the 2003 earthquake, the delimitation map of the areas exposed to natural hazards is required for the land use plan. And as PPSMVSS refers in its content to the land use plan and the plan of development and urban planning [8, 9]. What about the PPSMVSS of the two cities, Dellys and Tenes?

The two old towns of Dellys and Ténès were created

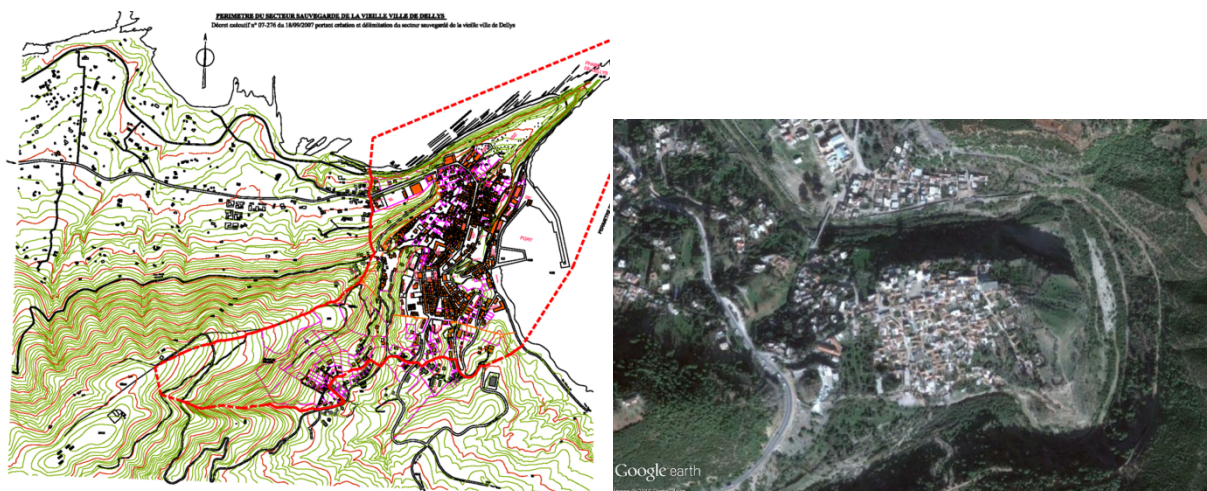


Fig. 1 From left to the right: the palace of the dey, mosque Katchaoua, Kasbah of Algiers. Source: the authors.

**Table 2** Gap between heritage protection and prevention of major risks.

Issues	Domains			
	Key date	Conservation of cultural heritage	Key date	The prevention of major hazards
Root concept approach tools	1962	Law No. 62-157 relative to the protection of historic sites and monuments and natural.	1989 2001	The Act No. 01-20 on December 12, 2001 relating to the planning and the sustainable development of the territory.
	1967	The Ordinance No. 281 on Dec. 20, 1967 relating to the archaeological excavations and to the protection of historic sites and monuments and natural.	2003	The Act No. 03-10 on July 13, 2003 relative to the protection of the environment in the framework of sustainable development.
	1998	Law No. 98-04 on June 15, 1998 relative to the protection of the cultural heritage.	2004	Law No. 05-04 on August 08, 2004 relating to land use planning and development. Law No. 04-20 on December 25, 2004 relative to the prevention of major hazards and disaster management within the framework of sustainable development.
	2003	The Decree No. 03-324 on October 5, 2003 laying down detailed rules for the establishment of the PPSMVSS.	2005	Law No. 89-26 on December 31, 1990, bringing finance act for 1990 to put in place the funds of natural disasters and major technological risks. The regulation Algerian earthquake 99 revised in 2003; Executive Decree No. 05-317 on September 10, 2005, laying down the procedures for the preparation and approval of the master plan for management and urban planning; Executive Decree No. 05-318 on September 10, 2005, laying down the procedures for the preparation and approval of the land use plan as well as the content of documents relating thereto.

Source: the authors

**Fig. 2** Images from left to right: the saved sectors of Dellys and Ténès.

in protected sectors in 2007.<sup>3</sup> They are all the time subjected to seismic risk. The two conservation areas are covered by PPSMVSS (Fig. 2).

The protected area of the old town of Dellys is submitted for likely publication in the Official Journal. The protected area of the old town of Ténès is in the

<sup>3</sup>Executive decree no.07-276 on September 18, 2007 about creation of saved sector of the old town Dellys. Executive decree no.07-277 on September 18, 2007 about creation of saved sector of the old town Ténès.

final editing phase. Both PPSMVSS were established in three phases.

Phase One of the project is diagnosis and emergency measures. Diagnosis is made in situ, and it highlights the frame of the conservation status of the various networks and determines the pathologies. In purpose of this phase, a project of emergency measures was proposed.

Phase Two is historical and typological analysis and

first draft project PPSMVSS parallel to the diagnostic and emergency measures. The fixed permanent safeguarded plan a number of land use rules, constraints to respect and special protection measures. It also determines the conditions under which architectural conservation is assured the built environment of the entire protected area.

The fabric typo morphologic analysis is particularly well suited for this type of study. It is based on a thorough reading of the conservation area fabrics referred in its historical, typological, architectural and constructive components.

In addition to the historical and typo morphologic studies of the conservation area, the various aspects of the area are developed as follows:

- physical and geotechnical study;
- demographic and socio-economic study;
- environmental study;
- study of the various networks.

A summary of these analytical studies enables the identification of existing interactions. After which, regulations and the guidelines for development are taken, aiming an integrated conservation and coherent development for this sector.

On referring to the Art. 18 of Executive Decree No. 05-318 of September 10, 2005, laying down the procedures for the preparation and approval of the land use plan, a map of the areas and land exposed to natural hazards and/or technological, classified according to their degree of vulnerability, must be established [10].

Phase Three is final editing of PPSMVSS. Once the second phase is approved, following a consultation with the different actors involved in the management of this plan, the final draft of the safeguard plan and permanent saved sector and enhancement is developed in accordance with the content of Executive Decree No. 03-324 of October 5, 2003 laying down rules for the establishment of the PPSMVSS [11, 12].

We found that the cards: geotechnical, easements and built environment of the conservation status are the only superficial address for the easement of natural and

technological hazards. The identification and classification map of seismic zones according to the degree of vulnerability of the two conservation areas is not established.<sup>4</sup>

#### **4. Conclusions**

After a decade of the earthquake that whipped Algeria in 2003, the safeguard sectors of the old towns are still fragile due to this seismic hazard.

In this situation, guidelines are proposed to complement the content of the safeguard permanent plan and enhancement (PPSMVSS) to prevent the seismic risk:

- the identification and classification of seismic areas of these safeguarded sectors according to their degree of vulnerability;
- establishment of vulnerability maps of the safeguarded sectors and seismic micro zoning;
- establishment of a general prevention plan.

Today, managers must take action of preventing anticipation, forecasting and natural risk management by integrating them into the different policies they put and implement in the time and the space.

#### **References**

- [1] SGG. 1998. *Law No.98-04 on June 15, 1998 Relative to the Protection of the Cultural Heritage*.
- [2] SGG. 2004. *Law No. 05-04 on August 18, 2004 Relative to Land Use Planning and Development*.
- [3] SGG. 2004. *Law No. 04-20 on December 25, 2004 Relative to the Prevention of Major Hazards and Disaster Management within the Framework of Sustainable Development*.
- [4] Ferrigni, F., and Helly, B. 1990. *Protection of the Built Heritage in Seismic Areas: Analyzes and Interventions*. Strasbourg: PACT.
- [5] Feilden, B. M. 1987. *Between Two Earthquakes : Cultural Property in Seismic Zones*. Los Angeles-Rome: Getty Conservation Institute-ICCROM.
- [6] UNESCO. 2010. *Managing Disaster Risks for World Heritage, Reference Manual*. UNESCO.

---

<sup>4</sup>Card enacted by Article No. 18 of the Executive Decree No. 05-318 on September 10, 2005, amending and supplementing the Executive Decree No. 91-178 on May 28, 1991, laying down the procedures for the preparation and approval of the land use plan.



**The Policies of Seismic Risk Management: Case of the  
Protected Areas of Dellys and Tenes Cities, Algeria**

- [7] UNISDR. n.d. "Terminology for Disaster Risk Reduction." UNISDR. Accessed May 23, 2013. <http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm>.
- [8] Directorate of Culture Wilaya of Boumerdes. 2014. *The Permanent Plan for the Safeguarding and Development of the Old Town of Dellys*. Directorate of Culture Wilaya of Boumerdes.
- [9] Directorate of Culture Wilaya of Chlef. 2014. *The Permanent Plan for the Safeguarding and Development of the Old Town of Ténès*. Directorate of Culture Wilaya of Chlef.
- [10] SGG. 2005. *The Executive Decree No. 05-317 on September 10, 2005, Laying down the Procedures for the Preparation and Approval of the Master Plan for Management and Urban Planning*.
- [11] SGG. 2005. *The Executive Decree No. 05-318 on September 10, 2005, Laying Down the Procedures for the Preparation and Approval of the Land Use Plan as Well as the Content of Documents Relating Thereto*.
- [12] SGG. 2003. *The Executive Decree No. 03-324 on October 5, 2003 Laying down Detailed Rules for the Establishment of the Permanent Plan for the Safeguarding and Development of the Saved Sectors (PPSMVSS)*.