**12th PPRD South “prevention and preparedness”**

**workshop for staff-level officials**

***“Multi-hazard risk assessment in urban environment”***

**Lisbon, Portugal**

**17-19 October 2012**

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**PPRD SOUTH PROGRAMME BACKGROUND INFORMATION**

As the successor of the previous EU funded “Pilot” and “Bridge” programmes on Euro-Mediterranean cooperation in Civil Protection, in March 2009 the **Euromed Programme on Prevention, Preparedness and Response to Natural and Man-made Disasters** (“PPRD South” or “Programme” – [www.euromedcp.eu](http://www.euromedcp.eu)) started under the service contract between the EC EuropeAid Development and Cooperation Office and the Consortium established by the Italian Civil Protection Department, jointly with the Civil Protection authorities of Algeria[[1]](#footnote-1), Egypt[[2]](#footnote-2) and France[[3]](#footnote-3) and the United Nations International Strategy for Disaster Reduction – UNISDR.

The Programme works jointly with the Civil Protection/Civil Defense Authorities of the Mediterranean Countries (“Partner Countries”), from the North African, Middle East and Balkan Region (refer to [www.euromedcp.eu](http://www.euromedcp.eu) for further details)

PPRD South aims to contribute to reinforce the quality of Civil Protection services in the Euro-Mediterranean region and to continue institutional cooperation in the field, both between the EU and the Partner Countries and among the Partner Countries themselves. For this purpose, PPRD South has planned a number of activities, including some initiatives aimed to improve knowledge in the Partner Countries of existing methodologies practices for effective disasters’ prevention and preparedness, at the regional, national and local levels.

**INTRODUCTION**

Several risks impend on any inhabited area of our planet: on the environment, on public and private properties, on strategic infrastructures. They are generated by different potential hazards, both natural and man-made, and have different relevance depending on the potential “synergy” between possible hazardous events and on the specific exposure and vulnerability of the affected area. In the past, the evaluation of risks related to different hazards was generally done through analyses which considered each hazard as independent from the others and which adopted diverse assessment procedures - in most cases simply qualitative estimates - and time-space frames. A ‘multi-risk’ index was then obtained through the simple aggregation of single risk indexes. Such risk assessment approach doesn’t allow comparing in a consistent manner risks of different origins and taking properly into account possible interactions among threats and/or ‘cascade’ effects.

Europe has been investing on the effort of better understanding the interdependencies between the different types of phenomena, as well as the importance of risk comparability. During the Sixth Research Framework Programme in fact financed the project “**NaRas-Natural Hazard Risk Assessment”**, jointly managed by the Universities of Naples, Thessaloniki and Nice Sophia Antipolis, which developed an innovative quantitative procedure for multi-hazard risk assessment which allows comparing the different existing hazards and accounting for all possible cascade events. The work of the NaRas project isdescribed in the **European Commission publication “Principles of multi-risk assessment”**.

Within the framework of the ongoing Seventh Research Framework Programme, the same effort has been funded again, in order to develop methods and tools to tackle multiple natural hazards within a common framework: this is in fact the main objective of the EU funded **project MATRIX (New Multi-Hazard and Multi-Risk Assessment Methods for Europe)**. This will allow future analysts to optimise the risk assessment process, will contribute to rationalising data management for hazards and vulnerability reduction, and will support cost-effective decisions on structural and non-structural mitigation/adaptation measures following a multi-hazard perspective. MATRIX is still an ongoing project, it will end on the 30th September 2012, it’s managed by GFZ (German Research Centre for Geosciences) and draws together twelve leading research institutions (eleven European and one Canadian); it also includes end-user partners from industry and the disaster reduction community.

According to the **UNISDR**, “Cities and urban areas represent dense and complex systems of interconnected services. As such, they face a growing number of issues that drive disaster risk. Strategies and policies can be developed to address each of these issues, as part of an overall vision to make cities of all sizes and profiles more resilient and livable”[[4]](#footnote-4). Therefore assessing disaster risk in urban environments requires the adoption of a ‘multi-hazard risk’ approach.

The just published **UNHABITAT State of Arab Cities 2012** indicates climate change induced extreme weather and sea level rise as key challenges for southern and eastern Mediterranean cities. These rising threats will have significant and largely negative impacts on cities in the Arab world by displacing farmers and increasing urbanization pressures – and therefore increasing exposure and vulnerability to disasters - increasing food imports, decreasing the availability of water in a region that is already water stressed, increasing the likelihood of flooding in coastal areas where most of the Arab world lives and increasing energy demands for cooling and desalination.

14 Mediterranean port cities with more than 1 million inhabitants are considered at increasing risk from severe storm-surge flooding, rising and warming sea and local land subsidence, according to an ongoing study by the Organization of Economic Cooperation and Development on “**Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes**”. Risk is also increased by poorly planned development which often brings more people in vulnerable areas. More than 1,5 million people living in Mediterranean port cities are exposed to a 1 in 100 year coastal flood event, the study says. The top six Mediterranean cities in terms of exposed population are estimated to be Alexandria – by far the most exposed with more than 1.3 million people at risk - Istanbul, Banghazi, Casablanca, Izmir and Algiers.

Multi-hazard assessment approaches are particularly relevant when addressing vulnerability of urban communities. The overall objective of the **EU-funded ENSURE project** - Enhancing resilience of communities and territories facing natural and na-tech hazards – was to develop innovative methods to measure the ability of communities and systems to resist and react to hazardous events. Damaging effects of a hazards can be minimized if specific characteristics and circumstances of a community, which falls under the concept of vulnerability, are reduced.

The main objective of the **EU funded MATRIX project** - New Multi-Hazard and Multi-Risk Assessment Methods for Europe - was to develop methods and tools to tackle multiple natural hazards within a common framework. Such methods and tools are deemed necessary on one side to optimise the risk assessment process including data management for hazards and vulnerability reduction, and on the other to support cost-effective decisions on structural and non-structural mitigation/adaptation measures following a multi-hazard perspective.

In particular MATRIX focused on risk comparability, cascading hazards and time-dependent vulnerability within the framework of conjoint or successive hazards,

1. **PURPOSE OF THE WORKSHOP AND ISSUES TO BE ADDRESSED**

Conceived as a back to back initiative to the PPRD South workshop on *“Increasing disaster resilience in urban settings”*, this event aims to guide the participants through the various steps required to make a consistent assessment of the vulnerability and risk from multiple hazards in an urban environment.

Participants will be illustrated the concepts of risk and vulnerability , at different spatial scales (regional and local), along with methodologies and tools to analyze the relationship between them.

They will be proposed examples and methodologies to explore the integration and connections of different types of vulnerability and investigate the temporal and spatial variability of the relations between different types of risks.

They will be introduced to innovative and comprehensive vulnerability and risk assessment models and parameters, along with case studies in which the integrated assessment models are applied to urban contexts exposed to multi-hazard risk. In particular, participants will be illustrated tools and techniques developed by two EU funded FP7 Research Projects – **MATRIX** and **ENSURE** - for the recognition of territorial elements and dynamics which could lead to different vulnerability levels, for identifying clear goals of a risk assessment process and for using vulnerability and risk assessment results for the design and implementation of possible policies for disaster risk management.

During two practical table-top exercises - based respectively on the application of the MATRIX risk assessment methods and on the ENSURE vulnerability assessment approaches - participants will organise and analyse available information on hazards, exposure, vulnerability in a city exposed to multiple hazards and will be guided through the entire process of risk assessment. These exercises will allow underlining most important knowledge elements which should appear in an assessment activity and how to build the sequence of working steps leading to an effective results. They will also provide intensive exchange of practices, lessons learnt and recommendations for the Partner Countries as well as for the PPRD South, where to focus in future.

A final comparison of the results of the two exercises will allow underlining similarities and differences among the two proposed methodologies.

1. Ministère de l’Intérieur et des Collectivités Locales, Direction Générale de la Protection Civile. [↑](#footnote-ref-1)
2. Ministry of the Interior, General Administration of Civil Protection. [↑](#footnote-ref-2)
3. Ministère de l’Intérieur, de l’Outre-mer et des Collectivités Territoriales, Direction de la Sécurité Civile. [↑](#footnote-ref-3)
4. UNISDR “How to make Cities More Resilient – A Handbook for Local Government Leaders”; A contribution to the global campaign 2010-2015, Making Cities Resilient – My City is Getting Ready! March 2012 [↑](#footnote-ref-4)