

## Urban geographies of vulnerability and resilience in the economic crisis era – the case of Athens

**Kalliopi SAPOUNTZAKI, Christos CHALKIAS**

*Harokopion University of Athens, Department of Geography, 70, El. Venizelou Str., Athens 17671, GREECE*

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### **Abstract:**

Government debt crisis and recession in Greece cause social, economic and demographic changes that increase human and social vulnerability to natural and climate change hazards, also to “forgotten” but re-emerging social risks (e.g. poverty, malnutrition, homelessness). Human and social vulnerability heightens further due to increase of the institutional, i.e. declining capacity of institutions to respond effectively to stressors. Resilience and adaptations that are performed as deliberate or uncontrolled reaction to increasing vulnerability result in vulnerability redistribution which only rarely turns to the benefit of the most vulnerable. Frequently, resilience performances become accountable for the emergence of new hazards and exposure as well as unfair vulnerability transference.

The present paper deals with the city of Athens and attempts to: (1) reveal the enhanced spectrum of risks, forms of exposure, and vulnerability in the city as a result of the crisis; (2) elevate the multiplying effect of the crisis on human and social vulnerability; (3) map the stressor-independent part of social-human vulnerability in Athens and (4) elevate adaptation/resilience resulting in vulnerability (re)allocation in time and space. Except of the theoretical background the paper turns to advantage geo-statistical data, findings of social survey studies and information being available by electronic and print media.

**Keywords:** *Social, human and institutional vulnerability, resilience to risk, economic crisis, Athens, chronic social risk.*

### **1. Introduction: Theoretical and methodological issues**

The present article deals with the potentiality of losses in what the inhabitants of Athens value (health, assets, shelter, property, locality, solidarity, cohesion, prosperity), as a result of extra vulnerabilities, exposure and hazards caused by the public debt and economic crisis. In particular the risks of concern are:

- Disaster risks (owing to natural and Climate Change hazards) that are assumed to have risen due to extra human, social, economic, institutional, ecological vulnerability as caused by the crisis;

- Chronic social risks “attacking” human health, home safety, food safety, shelter quality etc and arising among others from dereliction of protective urban structures and institutions (e.g., the social welfare system).

Regarding the first case, the authors concentrate on urban disaster risks which present a rich historical record in the case of Athens with respect to frequency / intensity of events and size of losses. These are (a) the seismic risk, (b) heat wave, and (c) urban flood risk. Below are some hazard definitions and theoretical clarifications regarding (b) and (c) risk types.

A heat wave can be simply defined as a “period of abnormally and uncomfortably hot and usually humid weather” (Glickman, 2000:3736) or just as “deviation from average temperatures” (Milligan, 2004:38). According to Robinson (2001) heat wave is an extended period of unusually high atmosphere-related heat stress, which causes temporary modifications in lifestyle and which may have adverse health consequences for the affected population. Thus, although a heat wave is a “meteorological phenomenon it cannot be assessed without reference to human impacts” (Robinson, 2001:763). It is for this reason that the index of heat stress usually employed is that of “apparent” temperature, an index “that combines just temperature and humidity to obtain an estimate of how it ‘feels’ to the human body” (*ibid*: 763). In addition, Robinson draws attention to absolute temperature values, to deviation from normal temperatures, and duration. “There is evidence that mortality is more likely during or after the second hot night, when the interior of un-air-conditioned buildings is likely to reflect the outdoor apparent temperature” (Robinson, 2001:764). It is however recognized that comfort criteria for any one region are dependent upon the normal conditions of that region. Social and cultural practices constitute in fact the coping capacity embodied in particular social contexts. In the context of climate conditions in Greece, heat wave is considered as a period of at least three days where temperatures in the lowland areas of mainland Greece are over 37°C and the mean day temperature is at least 31°C, meaning that it does not fall below 25-26°C during night hours (General Secretariat for Civil Protection, 2008).

Cities are extremely prone to heat waves, or, to put it the other way around, “heat waves are primarily an urban disaster” (Milligan, 2004:42). One reason is that cities are massive heat-absorbers, pollution is high, and urban ambient temperature is much higher than in the surrounding countryside due to the heat island effect. Systemic linkages with attenuating consequences exist on both, heat wave effects and heat wave generation and/or intensity. One should mention the massive clustering of buildings, existence of vast heat-absorbing public surfaces, absence of green spaces, volume of car traffic, atmospheric pollution, concentration of heat-emitting activities, and the presence of urban heat islands, which are the product of all previous factors and of meteorological conditions (Menoni, Sapountzaki and Wassenhoven, 2010).

An urban flood refers to “nuisance flooding of streets, underpasses, basements and other low-lying urban areas.... it should not be confused with flash flooding.... it is usually caused by poor drainage or limited drainage capacity of urban systems” (Ecology Dictionary, 2011). The amount and rate of precipitation that causes urban or small stream flooding is usually constant for a specific urban community (*ibid*). In the case of Athens

metropolitan region, a day cumulative precipitation that is over 10mm is an extreme precipitation event that may cause flooding (Vlahou, 2010).

As regards chronic social risks (of everyday life, the human life cycle), these are related to pressures which are typically continuous, cumulative, and often predictable. Examples are severe loss of income and poverty, forced migration in search of employment, food deprivation, homelessness also loss of accessibility to fuel for heating, health and elderly care services. Unemployment and dismantling of the social welfare system gave rise to forgotten risks in Athens under crisis, such as food insecurity and malnutrition, premature death, infectious diseases and morbidity, social and domestic violence, lack of safety at home, and others.

In the context of this work vulnerability is considered as propensity to loss under the effect of a stressor. In particular, the concepts of human and socio-economic vulnerability is not restricted in its use simply as a parameter in the determination of disaster risks (Birkmann, 2006, Greiving and Schmidt-Thomé, 2008, Greiving et al., 2012), but rather refers to a wide spectrum of social, natural, technological and ecological hazards and threats as well as their interactions. It is even used to describe the so-called “generic vulnerability of social groups and societies” (Young, 2010). Hence, there are two levels of vulnerability: Exceptional, that is vulnerability to extreme risks and everyday or vulnerability to chronic risks (Lavell, 2004).

Vulnerability and resilience are considered as distinct concepts but linked with each other or mutually interacting. As Sakdapolrak et al. (2008) put it resilience and vulnerability are interconnected in dialectic relationship. The basic assumptions of this paper - which are to be tested in the case of Athens - regarding social-human vulnerability and resilience to natural, climate change and socio-economic crisis risks are as follows:

- Not only climate change but also social risks triggered by public debt and financial crisis are risks of high uncertainty as they are characterized by surprise and limited predictability.
- Resilience refers to flexibility, learning and change (Adger et al., 2005; Tyler et al., 2013). Vulnerable elements in the city are systems (urban infrastructure and others), agents (e.g. individuals, households, businesses) and institutions; these are also elements of urban resilience or carriers of adaptive capacity (Tyler et al. 2013).
- Vulnerable elements may be faced simultaneously with several vulnerability facets, i.e., human, social, economic, functional, technical, institutional depending on the types of losses they are susceptible to.
- Adaptations of vulnerable elements result in vulnerability dynamics, i.e. transformation (e.g. to other facets, versus new hazards), transference of vulnerability to others, redistribution of vulnerability in time and/or rebalancing of own vulnerability facets (Nelson et al., 2007, Sapountzaki, 2012).
- Vulnerability dynamics often result in sharpened disparities; furthermore, deployment of resilience translates into “responsibilization” of individuals and communities for crises and other contingencies and uncertainty (Welsh, 2013).

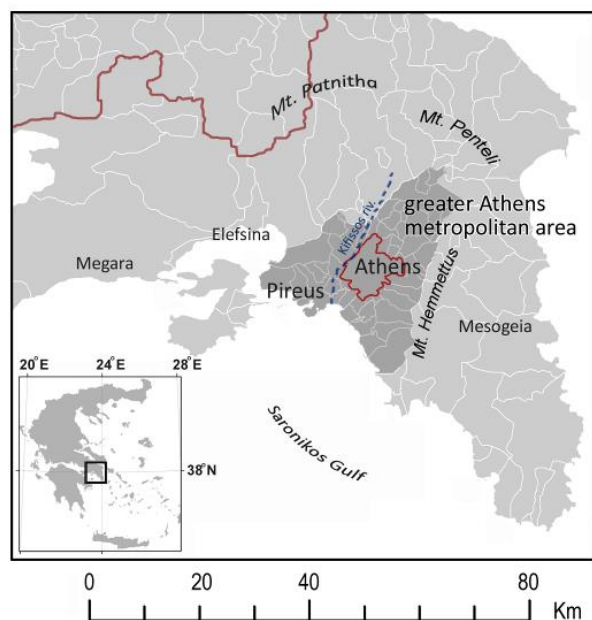
The present paper attempts to illustrate vulnerability (especially social and human) and resilience dynamics in Athens (versus socio-economic, natural

and climate change hazards) as enhanced by the crisis and elevate besides accountability of resilience for de-politicizing the crisis and transferring its impact to the powerless.

## 2. Historical exposure of Athens to natural hazards: Earthquakes, urban floods, and heat waves

Historically, Athens and the wider Attica Region (Figure 1) is one of the most exposed to natural hazards in Greece. This exposure includes geophysical, meteorological, hydrological, and climate-related hazards, predominantly earthquakes, floods, heat waves, and forest fires. High exposure is due to high concentration of people, economic activities, technical infrastructure, lifelines, and all sorts of valued assets, as well as mutual interrelationships within a restricted area which is a hazard-prone region besides. In particular:

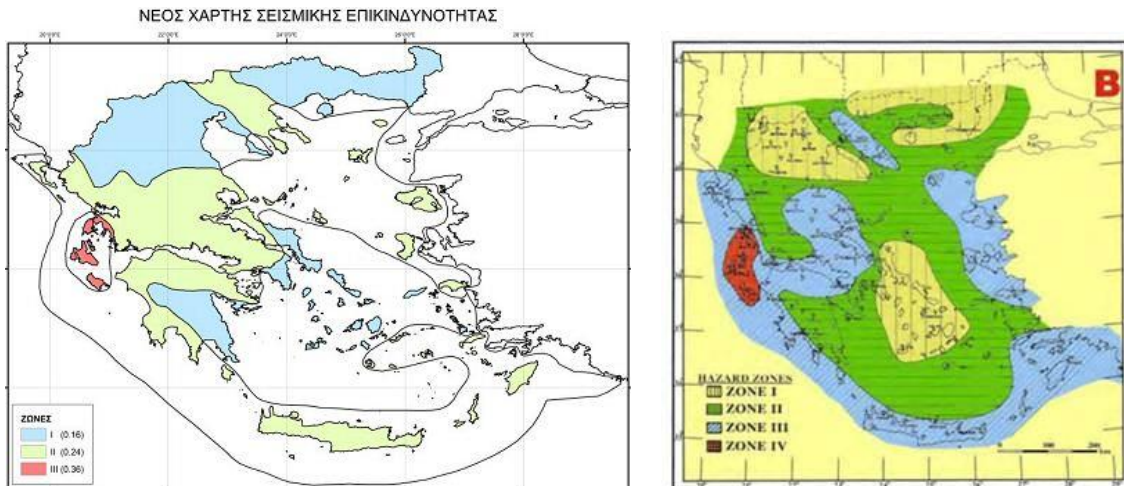
- Exposure of Athens metropolitan area to seismic hazard was found to be underestimated after the major seismic event of 1999, which claimed 140 lives and caused several building collapses. As a result, the new seismic hazard map of the country (which constitutes the basis for the New Greek Code for Earthquake Resistant Structures of 2000), placed a significant part of the Attica Region (and several northern Municipalities of Athens metropolitan area) into Hazard Zone II, i.e. a medium level zone (see Figure 2 and Figure 3) (Earthquake Protection and Planning Organization, 2013; Papazachos et al., 1989). Three seismic faults surround Athens. The active faults (basically at the borders of Attica) have an E-W and NW-SE general direction; the major ones are situated in the area of eastern Korinthiakos gulf and have an E-W general direction (Earthquake-net, 2013). Attica is among the Greek regions with the highest values of macroseismic intensities for the last 50 years (Papanastassiou et. al 2008, Chalkias et al. 2013).



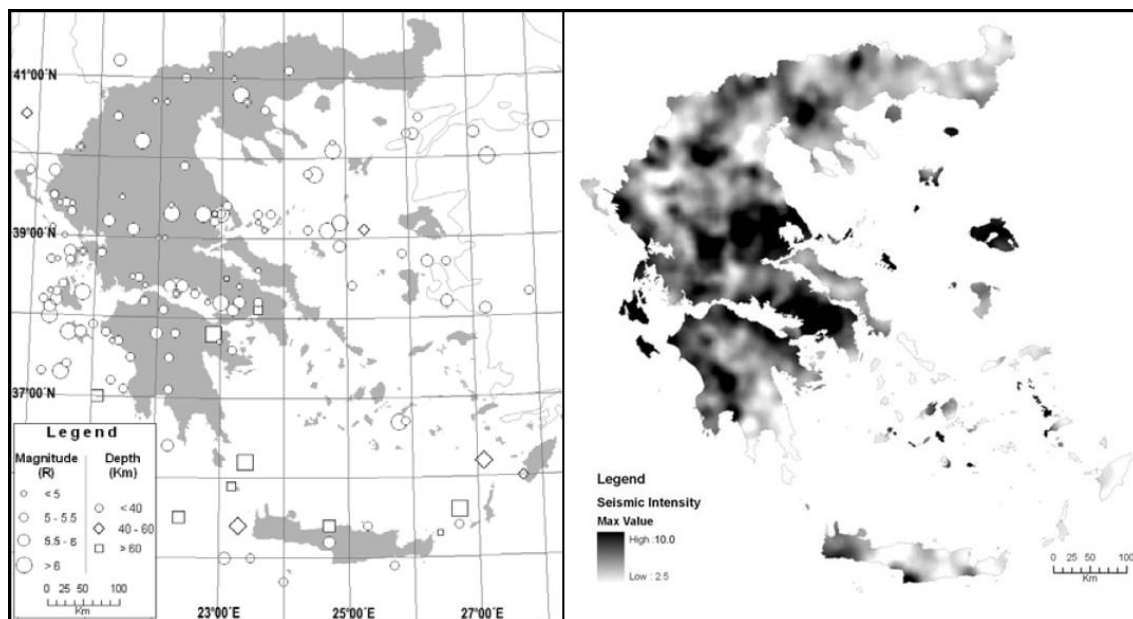
**Figure 1.** The wider Attica Region including the Athens basin surrounded by the mountain ranges of Hymettus, Parnitha and Penteli, the port of Piraeus, and the Mesogeia settlements and plain.

- Despite the fact that climate in Attica Region is temperate Mediterranean and generally mild, there are significant differences in temperature range between summer and winter. Though mean annual temperature in Attica is about 18.30°C, a temperature of 40°C is not rare in summer (i.e., heat wave). Athens is well-known for its particularly hot summers. The highest ever reported temperature in Athens (49°C in July 1977) has been the highest ever reported in Europe also (World Meteorological Organization, 2011). Attica is among the Greek regions hit the most by heat wave hazard (Vlahou, 2010). Greater Athens and especially specific parts of it suffer besides from what is known as Urban Heat Island (UHI) effect (Figure 4). Heat island formation is largely due to hard, heat-absorbing, dark-colored surfaces (e.g., rooftops, asphalt, concrete), which have a low albedo compared to vegetation and light-colored surfaces, i.e. a lower ability to

reflect solar radiation. Heat islands occur on the land surface and in the atmosphere. Surface urban heat islands are typically present day and night, but tend to be strongest during the day when the sun is shining (US Environmental Protection Agency, 2013).



**Figure 2.** The new (left) and old (right) hazard maps of Greece. The posterior one placed parts of Attica and the northern Municipalities of Athens metropolitan area in a higher hazard intensity zone (II) (Source: Earthquake Protection and Planning Organization of Greece, 2013; Papazachos et al., 1989).

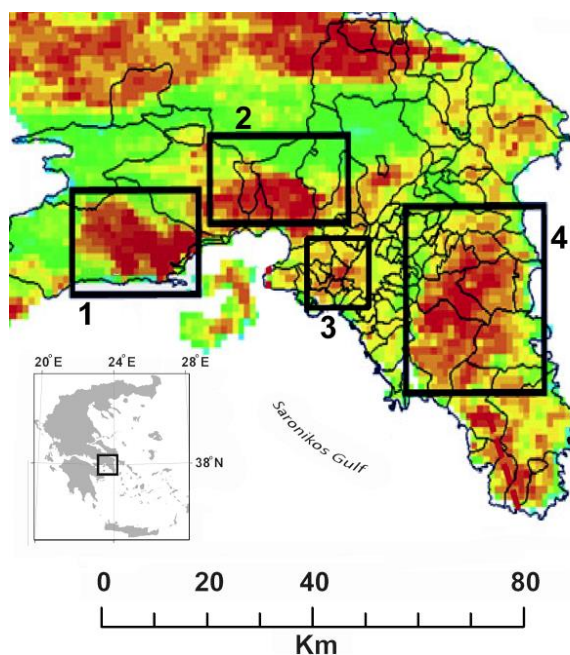


**Figure 3.** Major magnitude earthquakes (right) and maximum seismic intensities at site (left) in Greece for the period 1953-2008 (Source: Papanastassiou et al., 2008).

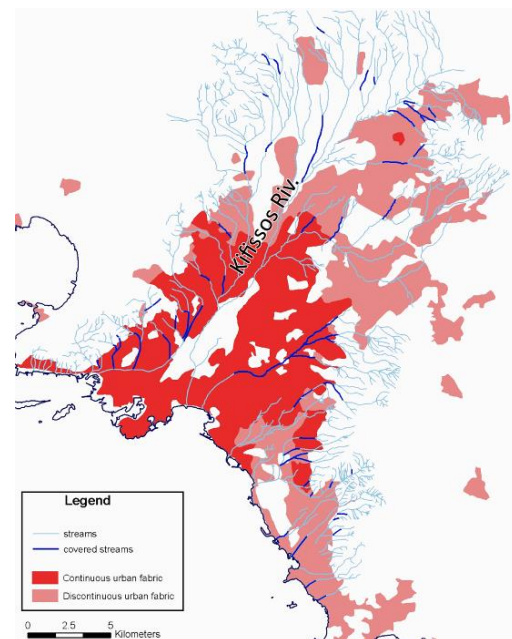
- Athens metropolitan area suffers frequently from flood damages and counts flood victims, especially in winter, despite the fact that the eastern regions of the country present mean annual rainfall as low as 300 mm (Mimikou and Koutsoyannis, 1995). Athens' proneness to flooding is due to a combination of factors: climatic, geo-morphological and factors related to

manmade interventions (Koutsoyannis, 2002). The dry climate of Attica and high evaporation rate combined with the natural relief did not favor the formulation of significant river networks and the cross-sections of the existing streams are narrow. However, the rainstorms in Athens are almost as high as in other parts of Greece (Mimikou and Koutsoyannis, 1995). Attica is one of the mostly hit by extreme precipitation Regions of the country in the last thirty years (Vlahou, 2010). Nevertheless, the most important factor determining Athens' exposure and physical vulnerability to floods is human interventions. The rapid urbanization of the last decades leaving minimal space for greenery had an aggravating effect on flood parameters. The natural stream network has been eliminated due to fill-in processes and on top street construction or building developments (Figure 5). This policy of streambed coverage that has been followed for decades or its unauthorized realization by private individuals with the connivance of the authorities dismantled Athens from its natural flood protection infrastructure. In general terms the old city centre which for more than a century has been equipped with combined sewers is less vulnerable to floods than the lately developed suburbs. Flood prone areas are particularly those at the periphery of the urban complex, i.e. the Municipalities along the Saronikos coast and those at foothill territories (Nikolaidou and Hatzichristou, 1995). Repeatedly forest fires in the mountain ranges surrounding the Athens basin have added to the exposure to flooding of the Municipalities of the urban periphery.

<sup>1</sup> The numbers 1 to 4 denote the four hot-spots of the study area, namely Megara (1), Elefsina-Aspropyrgos (2), Mesogeia (3), and city center (4).



**Figure 4.** A typical land-surface-temperature map for Greater Athens area, Greece, summer period<sup>1</sup> (Source: Keramitsoglou et al., 2011).



**Figure 5.** The covered and uncovered stream network in Metropolitan Athens basin (Source: Own elaboration).

Of the above exposures especially those related to climate change hazards, are expected to increase in the future. Heat waves in particular are a hazard that is certain to increase in severity as a result of global warming. This is also true of floods or forest fires, but heat waves are a more direct result of rising temperatures. While there have been examples of severe heat waves long before the recent alarming effects of global warming, e.g. in 1916, their

frequency and duration however have increased and in combination with the progression of urbanization and increase of greenhouse gas emissions this becomes a most worrying phenomenon. There have been two important reports on climate change impacts in Greece produced by the National Observatory of Athens. The first (Akylas et al., 2005) emphasizes that Greece has experienced in the 1990s a three-fold increase of heat waves in comparison to the previous 30-year period. The second report (National Observatory of Athens, 2005) includes forecasts for the Eastern Mediterranean for the period 2071-2100. Maximum temperatures in the southern regions of the country, including that of Athens (Attica), are expected to rise in 2071-2100 by 7-8°C!

### **3. Increase of vulnerability to natural hazards in the crisis era**

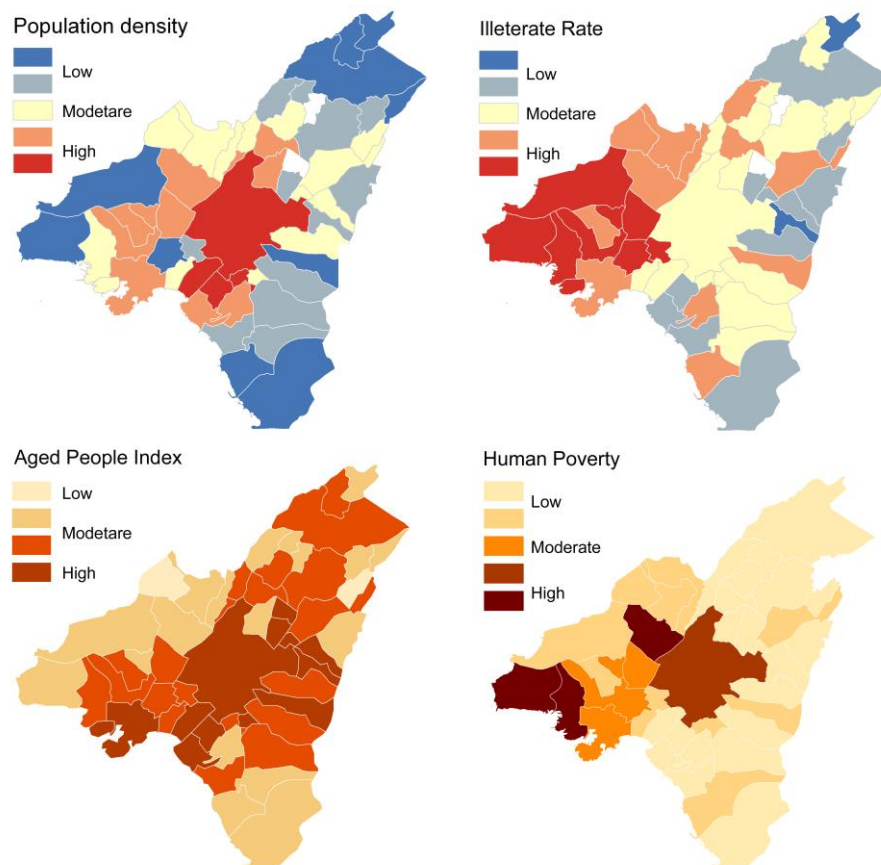
Social and economic vulnerability refers to the loss potential of human, social, and economic capital. Parker and Tapsell (2009), sum up the factors determining this aspect of vulnerability on the basis of suggestions and findings of Coleman (1990), Blaikie et al. (1994), Dynes (2006), and Cutter (2006) who argue that social-economic vulnerability of individuals and social groups to natural hazards depends first on institutional factors. Examples are the quality and security of homes, water, food and work; building safety; safety of public facilities, schools and colleges; civil protection; safety of hospitals, fire stations and other public infrastructure; disaster insurance and the quality and security of the social welfare system. In addition, social, economic, and political factors add to the vulnerability potential at the individual and community level, e.g., lack of social cohesion and exclusion, income inequality and poverty, gender and age factors, household structure, unemployment, low education level and morbidity, disability, lack of access to political power, lack of entitlements to access resources, obstacles to risk information, and risk culture.

During the public debt crisis and economic recession (2010-2013), almost every critical factor of those mentioned above has worsened in Greece and the Attica Region in particular. In Attica, unemployment has risen dramatically in the period between 2008 and 2012 (from 6.5% to 25.3% - Hellenic Statistical Authority, 2013). More specifically, the rate of the long term unemployed increased from 2.82% of total unemployment in 2008 to 15.1% in 2013 (*ibid*). Unemployment in Athens in the third quarter of 2012 is higher than the respective at the national level (28.4% and 26.4% respectively) (Hellenic Statistical Authority, 2013). In most cases, unemployment results from the failure of thousands of small businesses as well as expired short-term contracts of the public sector. Considering that national social protection programmes are lacking, the unemployed together with pensioners' majority and the working poor (i.e., workers with such low wages that they cannot meet basic needs) formulate the pool of the urban poor (i.e., those living on an income below 60% of the national median disposable income).

Other determinant vulnerability factors affected by the crisis are social cohesion and exclusion, degraded housing and urban environment connected to poverty, energy poverty, food safety and morbidity. After the crisis, social groups and urban areas burdened with several simultaneous and overlapping adverse social attributes and/or living conditions as is the case of old age or disability/morbidity overlapping with poverty, energy

poverty and low housing standards have grown and/or expanded rapidly. These are the most vulnerable to natural hazards.

The socio-spatial inequalities within Athens metropolitan area in pre-crisis terms have been explicitly analyzed by social geographers and urban planners (Emmanuel, 2004; Maloutas, 2004) and allow for interpretation and mapping of the then social vulnerability inequalities also. Figure 6 indicates spatial distribution of old age index, population density, illiterate rate and human poverty within Athens metropolitan area on the basis of census 2011 demographic and earlier human poverty data. Figure 7 presents spatial distribution of aggregate or “clustering” vulnerability in early-crisis terms. Estimation of this aggregate social / territorial vulnerability is based on the compilation of the above mentioned socioeconomic and demographic data for each municipality. The “aggregate vulnerability” disparities in early crisis terms as presented in Figure 7 are a precursor and indication of more intense analogous disparities in the course of the crisis.



**Figure 6.** Spatial distribution of classes of population density, illiterate rate, old age index and human poverty in Athens Metropolitan area (municipal level) (Source: Own elaboration on the basis of UNDP 2006, Kalogirou et al., 2011 and data from Hellenic Statistical Service, Census 2011 for demographic data).

Heat wave is an instructive example of how heightened social-economic vulnerability affects losses. Indeed, heat waves affect a relatively narrowly defined section of the population, i.e., the elderly, children, the sick and the

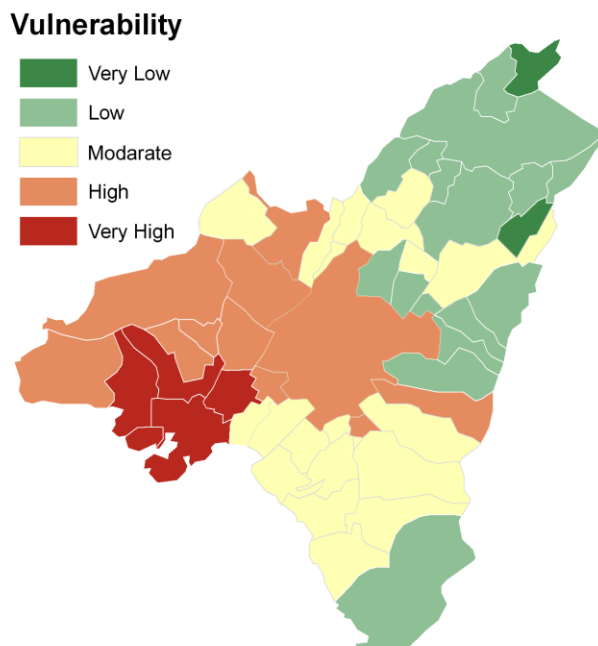


poor. Elderly and chronically ill people, especially when they live below the poverty line and/or are isolated from social support networks, cannot be easily protected. Social protection for such groups presupposes the existence of an advanced and sophisticated public welfare system (Menoni, Sapountzaki and Wassenhoven, 2010). During the last 10-15 years before the crisis (i.e., before 2009), the Greek cities, particularly Athens experienced rapid increase in the use of air conditioning due to deteriorating thermal conditions in the urban environment. However, even then, low income households tended to live in buildings inadequately protected (i.e. non-insulated and without double glazing) and lacking air-conditioning against heat extremes (Santamouris, 2005, 2007).

In the summer of 2007, the Building Environmental Studies' group made measurements of interior temperatures in 60 Athens low income dwellings, not equipped with insulation, double glazing and air conditioners. For 50% of the time, interior temperature exceeded 34°C and reached 42°C. During each heat wave, the mean building temperature was constantly rising to reach at the end of the heat wave approximately 38°C. The study clearly shows that low income groups are the first to suffer from changing climate conditions.

Institutional vulnerability is also affected by the crisis. Critical organizations and public agencies for civil protection and risk mitigation decline as they lose personnel, financial support, technical means and skills. This is the result of mergers, budget cuttings or even closure of public organizations

that had been critical for seismic protection, emergency management, and disaster recovery. An example is the 2011 merger (Law 4002/2011) of the Institute of Engineering Seismology and Earthquake Engineering (ITSAK), located in Thessaloniki, with the Earthquake Planning and Protection Organization (EPPO), located in Athens. The merger has been problematic among other reasons, because the first agency is a research institution while the second a state agency responsible for the national seismic protection policy. Another instructive example is forest policy. Competent institutions experience cutting of budgets which used to be invested in hiring seasonal fire fighters, procurement and maintenance of fire-fighting equipment, clearance of forest fuels, and opening of forest road network.



**Figure 7.** Distribution and territorial accumulation of social vulnerability in Athens Metropolitan area (municipal level) based on human poverty, education, and ageing (Source: Own elaboration).

In conclusion, social vulnerability to natural hazards presents an escalating trend since the beginning of the crisis, not only because of the effect of multiple social and economic

factors getting worse and worse but also because of the impact of growing institutional vulnerability. This is confirmed by Parker and Tapsell (2009:81) defining “institutional vulnerability” as “the exposure and vulnerability of individuals, communities or organizations to the uncontrollable adverse consequences of another organization’s critical shortcomings”.

#### **4. The government’s resilience to debt crisis: Impact on chronic risks and respective exposure and vulnerability**

Since the beginning of fiscal crisis in 2010 the Greek Government has displayed an outstanding capacity to avoid default (i.e. resilience); state adaptations however have translated into the production of new risks and exposures, particularly for the weakest social groups. A crowd of households in Athens are increasingly exposed to the chronic risks of malnutrition, infectious diseases and epidemics, psychological depression and suicide, premature death, criminal assault, homelessness and forced migration. The reasons are related to wage and pension cuttings, elevation of direct and indirect taxation, dismissals and unemployment, shrinkage of social welfare public provisions and other policies aiming at fiscal rationalization and remediation. This has been indeed a resilient political option of the Government which opted dismantling the welfare system instead of other possible options such as chasing tax evasion or cutting the privileges of political and economic elite. It is obvious that this is about transformation of state’s vulnerability (to debt crisis) to human and social and its transference to every social group dependent on the state’s welfare system. It is worth-noting that Island rejected (by means of a referendum) the option of austerity measures at least as regards its social welfare system and continued to invest on it. As a result, there have not been any obvious consequences of the crisis on public health.

Of the chronic risks which reemerged with the crisis the most important are those related to health. The literature offers already strong evidence about the relationship between income status and health indicators such as morbidity, mortality, life expectancy and accessibility to medical care services (Mackenbach, 2005; Wagstaff, 2002; Singh and Yu, 1996). Besides, economic recession increases health status inequalities (Stuckler et al., 2009). Unemployment, part-time employment, income inequalities, job insecurity and homelessness drive always larger groups to social exclusion and cause increase of cases of psychological disturbances (stress, depression etc). The unemployed and their families are at higher risk of premature death, chronic diseases and disability. In the long term unemployment increases the risk of self-injury and suicide and is also connected to increase of alcohol daily consumption with evident long-term health consequences (Maliarou and Sarafis, 2012). A study by Mckee et al. (2009) has shown that increase in unemployment by 1% is related to parallel increase in suicides by 0.79% and in mortality rate by 2.18.

Tightly connected to the problem of unemployment and poverty is homelessness. According to the NGO “Praksis” in January 2012, homeless people in Athens counted more than 11,000 (Greeks and immigrants) (radio station Athina 9.84, 31/1/2012). “Homeless on the Street”, according to ETHOS (the European Typology of Homelessness and Housing Exclusion) is only one and the most visible side of homelessness. A 2011-2012 survey carried out by the NGO “Klimaka” on the basis of a sample of 214 homeless persons (Greeks and immigrants living in Greece more than 8 years)

revealed the profile of the homeless in Athens: they are male, aged between 41-55, and graduates of primary school (Barbagianni, 2013). More than half of them lodge in the city center, one third of them are divorced and half are parents; 67.5% report that they are recipients of indifferent or hostile behavior of relatives and 65% are homeless for a period less than two years basically because of economic reasons. The sense of insecurity and lack of accessibility to hygiene facilities are the basic problems reported by the interviewed. Health status for more than half of them is bad and state that they suffer from medical problems (dermatological, psychiatric, dependency); besides 58% are not covered by health insurance (*ibid*).

Another social group which grew with the crisis is formulated by households which are not homeless but currently live under conditions of "material deprivation". In case of "extreme material deprivation", households live without enough heating, electricity and use of either a car or a telephone. These may have a poor diet, devoid of meat or fish on a weekly basis, as well as total or partial inability to meet emergency expenses or payments for rent and bills. Furthermore, poverty is connected to the risk of diseases owing to habitation in degraded environments, insufficient nutrition and working under hazardous or unhealthy conditions. On top, low education levels of the poor deprive them of accessibility to risk information and risk (to health) knowledge and inhibits accessibility to satisfactory medical services. Low income entails lower accessibility to preventive (consultancy) and curing medical services of high standards (Maliarou and Sarafis, 2012).

In conditions of economic recession, public medical care organizations suffer also from financial problems due to reduction of the respective public expenses. Besides, public deficit and unemployment compress public insurance budgets and cause fluidity problems to private medical companies. Consequently, at the time when the demand for public medical services increases (due to loss of income and increase of disease incidences) the medical care system becomes always more vulnerable (Maliarou and Sarafis, 2012).

There are strong indications that above theoretical suggestions are valid in the case of Athens under current conditions of public debt crisis and economic recession. Publications in the medical journal *The Lancet* confirm increase of the incidents of suicides and of contagious diseases (Economou et al., 2011). Articles and reports in domestic and international mass media speak for health problems of the victimized social groups and disintegration of the medical care system. In a report in the electronic newspaper in.gr (27.3.2013) one learns that hospitals in major urban centres struggle to preserve their basic functions at the time when infections resistant to antibiotics increase and the sick are faced with scarcity of medicines. The same article reports that many of those suffering from diseases appeal to medical care services only at a late stage of the disease even if this option entails deterioration of health status.

In terms of spatial distribution, the groups exposed and vulnerable to newly or re-emerging chronic risks are anticipated to cluster in the areas of high social vulnerability in pre-crisis terms. This is confirmed by literature suggesting that the already vulnerable are principally those receiving the extra vulnerability and exposure arising from following crisis events. Hence, extra vulnerability and exposure to chronic risks are expected to be found

basically in central and western Athens districts hosting high proportions of aged, groups living below the poverty line and of the illiterate.

### **5. People's resilience producing new hazards and exposures and amplifying vulnerability**

It has been documented already why and how the Greek Government has transferred extra vulnerability, social and human, especially to the low income, the pensioners' households and those with unemployed members. On their part vulnerable people, local authorities and social organizations employ novel resilience attitudes (sometimes widely beneficial and sometimes harmful to themselves or others currently or in the long-term) in their attempt to manage the unexpected risks of everyday life and amplified vulnerability. Examples of resilience initiatives (within the private and social sector) which prove to be beneficial to the public interest also, are: reduction of the use of private cars and turning to public transportation to avoid costly fuels; limiting wastage at home; energy saving at home to avoid high electricity bills; building social structures for direct response to poverty, such as social groceries, social pharmacies, open centers for daily reception of homeless, structures for common meals offer, municipal vegetable gardens, dormitories, liaison offices, time-exchange banks etc (Bourikos, 2013). These structures achieve transference of vulnerability from the most to less vulnerable social, economic or institutional agents. For instance, the social groceries, while offering essentials free of charge to persons in need, attract some of the clientele of supermarkets by selling goods at super market prices.

On the other hand there are several examples of resilience initiatives which have proved to be harmful in the long term and/or to other agents and/or to the wider public interest. Instructive cases are: turning to wood fuel for heating, resorting to cheaper but unsafe housing accommodation, co-habitation with relatives in inadequate apartment spaces, turning to cheap meals and food stuff of questionable safety.

Above practices have already led or may lead in the future to new hazards and exposures: atmospheric pollution, technological accidents, urban fires, communicable diseases, morbidity, illegal wood-cutting and deforestation. Resilience attitudes of groups and individuals may also increase institutional vulnerability when they function as mechanisms of vulnerability transference to public agencies and collective interest institutions. Interesting example is post-crisis reduction of the population of volunteer fire-fighters because several of them quit volunteering for the sake of a second part-time job.

Resilience practices tend to flourish in those neighborhoods and districts where social and human vulnerability is high. This confirms theoretical assumptions speaking for parallel development of vulnerability and resilience in contrast to consideration of the two concepts as excluding one another.

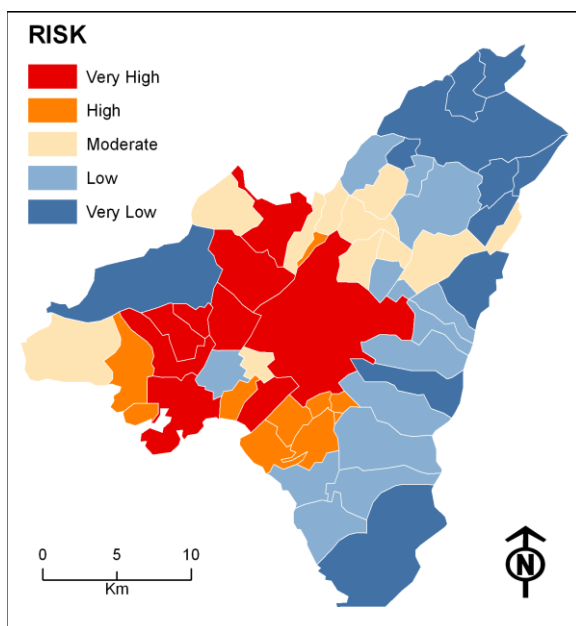
Local Authorities (LAs) also tend to develop resilient policy solutions in cases of "black holes" in LA budgets or when they suffer from radically reduced budgets (i.e., high institutional and economic vulnerability). Institutional resilience (e.g. by means of patronizing a social drugstore) helps authorities to prove interest for their voters and reclaim public trust and political acceptance.

It follows then that resilience versus crisis' risks and vulnerability originates from a variety of agents and institutions:

- Individuals by making re-arrangements, i.e. changing their place of residence, housing accommodation, family structure, housing loan repayment period, energy consumption and mobility patterns, food consumption patterns etc.;
- Social groups by building barter economy and other solidarity structures to boycott costliness of essentials in the free market;
- Retail and wholesale markets by turning to cheaper raw materials and low quality goods and commodities;
- LAs by cooperating with NGO's to build structures for direct response to unemployment, poverty and homelessness in an effort to rehabilitate their traumatized profile and regain political prestige.

<sup>2</sup> The map is produced through integration of the vulnerability map (7), exposure map (as reflected into the population density map), and the hazard map 4 (zoning of the area on the basis of the heat island effect).  
Source: Own elaboration.

The impact of the process of “vulnerability resetting” in Athens as a result of resilience of numerous social agents and institutions (at multiple scales) on each one of these agents and on the city as a whole is still unpredictable. According to the Government’s rhetoric priority should be given to the sustenance of public finances and macro-economic robustness of the country in the context of the Eurozone. The implications however of Government’s resilience for the vulnerability and prospects of sustenance of weak social groups and local level institutions in Athens and other Greek cities remain an open question.



**Figure 8.** Distribution of the risk of extreme summer temperatures in Athens Metropolitan area (municipal level).<sup>2</sup>

## 6. Discussion

It has been indicated that currently Athens under the economic crisis is faced with an enlarged spectrum of chronic social risks and heightened vulnerabilities and exposure to these risks. Actually, these are not new but historical risks having been experienced in Greece during national crises and war periods. Since 2010, these have recurred or heightened as a result of a resilient Greek Government managing to transform state’s vulnerability (to public debt crisis) into social, human and institutional. In turn, the traumatized social and institutional agents resort to individualized adaptations as the only means of own vulnerability management. These private resilience responses (often conflicting with one-another) set in motion a second cycle of vulnerability transformation and re-allocation to other agents, to the long term and/or versus other hazards. Dynamics of resilience depend on accessibility to resources and do not translate into collective and comprehensive vulnerability mitigation or

correction of the respective disparities. After redistribution however, vulnerability might return back to jeopardize even the Government’s stability. Indeed governmental parties have become a political target at least on part of the most vulnerable.

Deterioration of social and human vulnerability refers not only to the “everyday” type of risks but also to the “exceptional” type associated with natural and climate hazards. Worst vulnerability positions are those which having been the most vulnerable in pre-crisis terms received extra vulnerability due to the crisis. For instance, the aged who are anyway vulnerable to the heat wave hazard became much more so after pensions’ cutting and loss of accessibility to insulated housing accommodation, health and elderly care services. When the highest aggregate vulnerability is combined with highest exposure to a hazard the worst risk positions are evidently produced. Figure 8 illustrates the highest, medium, and lowest risk areas for the case of extreme summer surface temperatures.

Above findings regarding the dynamics of urban resilience and vulnerability during the crisis justify the criticism on resilience. The lonely and blind adaptation paths opted by desperate agents attempting to get rid of own vulnerability remind us of Welsh’s (2013:2) critical statement:

*“In this period of crisis versions of resilience are being mobilized to facilitate archetypal governmental technologies of neo-liberalism; government at a distance, technologies of responsabilization and practices of subjectification that produce ....autonomous and entrepreneurial subjects in a world of naturalized uncertainty and crisis”.*

The mobilizers however should take care of vulnerability bouncing back.

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