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**REGIONAL  
DEVELOPMENT,  
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PLANNING AND  
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## VULNERABILITY OF NATURAL AND CULTURAL HERITAGE IN RELATION TO CLIMATE CHANGE - NEW CHALLENGE FOR SPATIAL AND URBAN PLANNING

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### 1. INTRODUCTION

In the course of the last century the industrial and technological development jeopardized many natural and cultural values in Europe and therefore diminished the living quality for many inhabitants.

The first decade of this century brought knowledge on climate changes which placed the consideration of the environmental state and the relation between man and nature to the forefront, as the evidence that the negative consequences of human factors cannot be improved. The wider public is informed about the consequences of the climate changes and the awareness on ecological values and the significance of spatial resources is progressively increased.

One of the generally accepted definitions on climate changes is that "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (Article 1 of the United Nations Framework Convention on Climate Change (UNFCCC)).

The climate changes presented a completely new challenge for spatial planning and research, especially when the European Commission in 2009, announcing the White paper on adapting to climate changes at the EU level, underlined the key role of spatial planning which should establish the adaptation measures through coordinated and integrated approach within the national strategic documents for spatial development (COM (2009) 147).

The spatial and urban planners already have experience in balancing between the social, economic and the environmental problems while considering the directions of spatial development. The preferred mainstream today is that planning is not just preparation of the plan which should present rearrangements of physical structure in space, but it is a part of the political process with the aim to balance relevant public and private interests, to revitalize conflicting demands of spatial and development programs, having the role of mediator in the process (The New Charter of Athens 2003). "Predicting and managing the impacts that

climate change will have on World Heritage is a real challenge, but considering the importance of the issue, it is now timely to face this problem." (UNESCO, 2007).

From the spatial planning point of view the challenge is first of all putting the climate changes into the broad thematical frame, raising the question of technological development, energy resources, market, civil society and the economic gap between developed and nondeveloped countries.

Many of the planners are already aware of this challenge, but are still without enough information and established methods to take them into consideration in full scope, when elaborating the planned aims and developmental options. At the start of coping with this challenge, the actors of spatial planning need new insights oriented (a) towards better understanding of correlation between the climate changes with processes and relations in space; and (b) towards thinking beyond the usual time horizon of the spatial plan validity.

The protection, organization and use of natural and cultural heritage within the spatial and urban planning, is based on three groups of principles: principle of sustainable development, integrative protection and integral planning (Kurtović-Folić, 2009). The principle of sustainable development implies rational use and protection of space and as such, represents the basic principle in securing protection of the cultural heritage environment. The increase of the natural and cultural heritage fund is one of the basic supports to the sustainable development, in accordance with the idea on developing/continuous process of protection and conservation respecting the development needs of communities. The principle of integrative protection implies, first of all, integration of demands for the protection of natural and cultural heritage and harmonization of these demands with the aim to spatial development. One of the primary tasks is the protection of heritage in the adequate environment, constructed, or natural and adapted to the needs of a community. This principle presumes that the natural and cultural heritage is placed in the same level with other legitimate interests in the planning process, but also that the heritage as the encountered resource, directs the development and decision making in organization and use of space (Kurtović-Folić, 2009).

The greatest contribution in integral approach to spatial planning is in overview of conflicts between the prevention of new risks and different interests in the use of land, its solving and further implementation. Thereby, increased possibility is achieved in adapting the space to the existing, but also in decreasing the space vulnerability by the future, climate changes. Reconsideration of approach to spatial planning and its adaptation to the new thematic and problematic demands, represents the platform for further researches with the aim to form recommendations for the concrete actions in adaptation to climate changes by innovative process of spatial planning (Bazik, Dželebdžić, 2011).

## 2. THE INFLUENCE OF CLIMATE CHANGES TO NATURAL AND CULTURAL HERITAGE

The adaptation and mitigation of climate changes becomes an urgent multi-dimensional and interdisciplinary area for consideration and research. The climate changes are not only the question of the human environmental protection and ecological awareness. This terminology covers main topics of this century: economic growth, energetic safety and sustainable living environment (Simurdić, ed. 2010).

"Several key indicators are used in the scientific literature to describe climate change among which: greenhouse gas composition (in particular CO<sub>2</sub>), surface temperature, precipitation (rain, snow, hail), snow cover, sea and river ice, glaciers, sea level, climate variability, extreme weather events. The assessment reports of IPCC constitute the most authoritative reference on the extent of variation of these indicators that can be attributed to climate change." (UNESCO, 2007).

The greenhouse gas concentration (including carbon dioxide, methane, nitrogen oxides and the big number of gasses that are released in industrial processes) is increased as the result of human activities. Between 1970 and 2004 the increase of these gases concentration was 70%. The continuity of greenhouse gases increase can cause further warming and many changes in the global climate system during this century which will, most probably be more intensive from the ones recorded during the last century (IPCC, 2007a).

According to IPCC report from 2007, predictions are that the growth of global temperature in the next two decades will be 0.2°C in each decade, which is one of the scenarios of greenhouse gas emission proposed by the IPCC Special Report on Emissions Scenarios – SRES, 2000.

The growth of the average annual mean temperature for Europe is expected to be higher from the global level, but also the increased risk of flash floods and often floods in coastal areas is expected. The surfaces under ice and snow in the high mountain areas will be lowered, which might cause weakening of winter tourism. High temperature and droughts in the South Europe might reduce availability of drinking water, production of hydro energy, summer tourism and food production. The health conditions might be endangered by the rapid heat waves and fires. According to the European Environment Agency (2004), the main expected changes as a result of climatic change are:

- an increase by 1.4 to 5.8 °C by 2100 in global mean temperatures;
- an intensification of the hydrological cycle, with increased intensity of rainfall events; but at the same time more frequent droughts in arid and semi-arid areas;
- an increase in global sea level of 0.09 to 0.88 m by 2100;
- an increased frequency of storm surges locally.

According to the new evaluations of the Intergovernmental Panel on Climate Change connected to the regional changes in the South European region, besides the trend in rising air temperature and evaporation, further reduction of days with snow is expected in the next period, decrease of precipitation during the warm periods of year followed by decreased water flow, soil humidity and availability of water resources. In addition to changes in the mean values of climatic factors, changes in the frequency and intensity of climate extremes are also predicted. That can mean often storms, followed by floods and destructive wind influence, droughts, extremely high and low air temperatures, heat waves, snow blizzards, avalanches, landslides, forest fires, etc. Due to the adverse effects to food production and energy, water supply, biodiversity and human health, the South European region is ranked among very vulnerable to climate changes by the Report of the Intergovernmental Panel on Climate Change (IPCC, 2007b).

The first Report of the Republic of Serbia, in accordance with the United Nation Framework Convention on climate change (2011) pointed out that further increase of temperature can be expected at the annual level. According to one scenario, the temperature increase in the period 2001-2030 can vary from 3,4 to 3,8°C. Also, according to this first scenario, the change in precipitations in the first thirty years of this century would be slightly positive with values up to +5% at the biggest part of territory in relation to the reference period 1961 -1990. According to the second scenario, at the territory of Serbia during the last thirty years of this century we would have deficit in precipitations at annual level with maximum of -15%. The assessment is that the adverse climate conditions caused by further temperature growth, reduction of precipitations and other changes in the climate system in future will certainly have multiple negative effects. The influence to water resources, including damped natural habitats (until the year 2100), according to the preliminary evaluations will be reflected in the reduction of water flow (until 2020 for 12.5% and until 2100 for 19%). The influence to forest cover that was evident in the last decades will probably be increased by droughts, insects invasions and often appearances of forests fires, threatening to be the cause for transformation of the whole forest ecosystem, moving the order and content of forests. Given the projected changes of climate, the huge vulnerability of natural ecosystem is expected. The preliminary evaluation of climate change influences to biodiversity shows that phenological changes can happen and habitats can be lost, but also new habitats can be established.

These presumptions already indicate the series of potential influences of climate changes to natural and cultural heritage.

1) According to the UNESCO Report for 2007, the potential influences to the **natural ecosystems** (terrestrial) include more aspects (quotation, p.20):

- For species distributions:
  - individualistic species responses in latitudinal and altitudinal directions,
  - individualistic species responses to warmer/cooler and drier/moister conditions,

- geographic variation in the magnitude of species responses to the changing conditions,
- species range shifts/losses due to range expansions, contractions and eliminations,
- species range shifts relative to reserve boundaries: net loss/gain of species in reserves,
- local, regional and global extinctions of species due to the changing conditions,
- migration of invasive alien species and/or pathogens and parasites;
- For community composition and configuration:
  - changes in presence/absence and relative/absolute abundance (evenness/richness),
  - formation of non-analogue communities (new species assemblages);
- For ecosystem functioning, services and states:
  - changes in phenology (the timing of events such as flowering),
  - changes in nutrient cycling and natural resource supply (e.g. water),
  - changes in predator-prey, parasite-host, plant-pollinator and plant-disperser relationships,
  - changes in ecosystem services such as pest control, pollination and soil stabilisation;
  - ecosystem switches following changes in ecosystem functioning and disturbance regimes;
- For disturbance regimes:
  - changes in the intensity, frequency and seasonality of extreme events such as fires, floods, droughts,
  - changes in human land-use pressures (global change synergies).

2) **The cultural heritage** also suffers in different ways from the influence of climate factors and there are more and more evidences (UNESCO, 2007; 2008a; Cassar, 2005). Among the main threats for the cultural heritage are: hurricane and storms, sea-level rise, erosion (both wind and water driven), flooding, rainfall increase, drought, desertification, rise in temperature. A few examples from the literature can illustrate these influences.

- Threat for archaeological remains, even for their disappearance can present changes in quantity and distribution of precipitation, causing floods and penepains. "Archaeological remains and related evidence will be affected when the hydrological, chemical and biological processes of the soil change. Since historic buildings materials are more porous than modern constructions, any increases in soil moisture might result in greater salt mobilisation; consequently drying will cause salt crystallisation to damage decorated surfaces" (UNESCO, 2008a, p.10).

- "Strong changes between water levels for summers and winters will have a tremendous effect on those sites which are situated in the area of dry-wet cycles. ... Many sites will be endangered by sea level rise and storm surge... Humidity and temperature have synergistic effects on pests and diseases: 'Changes to relative humidity could result in new sorts of insect pests attacking collections.' ... Timber and other organic building materials may be subject to increased biological infestation such as migration of pests in



altitudes and latitudes that may not have been previously concerned by such threats ..." (Cassar, 2005, pp.22-26).

- "Historic buildings have a greater intimacy with the ground than modern ones. They are more porous and draw water from the ground into their structure and lose it to the environment by surface evaporation. Their wall surfaces and floors are the point of exchange for these reactions. Increases in soil moisture might result in greater salt mobilisation and consequent damaging crystallisation on decorated surfaces through drying.... Flooding may damage building materials not designed to withstand prolonged immersion, and post flooding drying may encourage the growth of damaging micro-organisms such as moulds." (UNESCO, 2007).

Extracting different types of the protected areas according to the risk degree on climate changes is exceptionally important for spatial planning. According to the results of UNESCO (2007) research, particularly endangered are the following:

- small and/or isolated protected areas;
- protected areas with high-altitude environments;
- protected areas with low-altitude environments;
- protected areas with rare or threatened species with restricted habitats or home ranges;
- protected areas with species at the limits of their latitudinal or altitudinal range;
- protected areas with abrupt land-use transitions outside their boundaries;
- protected areas without usable connecting migration corridors;
- protected areas with rare or threatened species near the coast;
- protected areas with interior wetlands.

The "absence of the theme about climate change" (mitigation and adaptation) in spatial and planning practice is evident in Serbia (Maruna, Bajec, Mihajlov, 2011). It is a fact that "besides theory, Serbia in practice still has no developed evaluation methods and instruments for adaptation to climate changes, nor has developed legislative that can introduce obligations and that can encourage the interested parties to adapt their interests in accordance with such new system" (Cvejić et al., 2011).

The world scientific researches point out that the climate changes are global by their causes and consequences, and therefore only the joint international action is capable to start effective and efficient solutions at different levels. The consequences of climate changes cannot be predicted with the complete certainty, but it is already enough known to consider the risks in the increase of air temperature, availability of drinking water, reduction of biodiversity, food quality, i.e. the complete living conditions.

In order to realize transformation to a climate-smart world, it is necessary to act now, to act jointly and to act at many fronts (World Bank, 2010).

### **3. THE OBJECTIVES AND PRINCIPLES OF PROTECTION, ORGANIZATION AND USE OF NATURAL AND CULTURAL HERITAGE**

The basic principle in the field of spatial and urban planning is to articulate the natural and cultural heritage as a developing resource, to protect and put in order and use in a way that will support establishment of the regional and local identity in accordance with the European standards for protection (PPRS, 2010). In accordance with these principles mutual aims for the protection and use of natural and cultural property derive and should be applied in practice for spatial and urban planning:

- Creation of the regional identity on the basis of conservation and protection of natural and cultural heritage;
- Orientation towards increasing the natural and cultural heritage fund, as one of the guarantee for sustainable development;
- Activation of natural and cultural heritage potential as a developing element;
- Conservation of the authentic natural and cultural property and their environment, as the integrity measure with all its characteristics;
- Protection from the uncontrolled construction of facilities that can endanger the integrity of properties and its environment;
- Consistent presentation of the heritage and creation of conditions for better regional and international connection of regions on basis of the spatial identity.

The knowledge of possible consequences to climate changes demands reconsideration of the fundamental conceptual setting, on the protection and use of natural and cultural heritage, in accordance with aforementioned generally accepted aims and in accordance with the universally accepted standards within the frames of international conventions (primarily, Operational Guidelines for the Implementation of the World Heritage Convention, Ramsar Convention on Wetlands , UNESCO's Programme on Man and the Biosphere -MAB).

- *Application of "landscape approach" for protection and management of the natural and cultural heritage*

In actual planning practice, the concept of protection and use of natural and cultural property starts from identification of scenery – recognition of space identity on the basis of expressed concentration of natural and cultural property (visual, historical and style connection). In that sense the development and use of space is broadened from protectual treatment of individual buildings and complex structures to the landscape planning. It is important to completely perceive the regional identity of the locality in selection of spatial-development structure, in accordance to number, diversity and value of spatial and cultural heritage that has to be protected, conserved and presented in the adequate way.

The question that might be raised soon is whether this approach is sustainable if some of the facts important for recognition – space identity is lost as the consequence of climate changes?

- *The applicability of the principles for permanent conservation of natural and cultural heritage*

Parallel to the previous question is reconsideration of the thesis that the protected regions are maintained on permanent basis. The question of validity of such thesis can substantiate the example of melting "permanent" snow and ice at the mountains and poles, which presence, was actually the main reason for these regions to be proclaimed protected areas.

- *The applicability of the principles to protect all inheritance*

The basic conceptual principle for the protection is to preserve and protect all inheritance independently from its formal status, i.e. if it is categorized, registered or just recorded or has only been identified. The existing concept of protection starts from the assumption that all identified and recorded property will be proclaimed and categorized over time, depending on sequence of activities of the protection services, so the spatial plan cannot be the legal frame for negligence of cultural heritage. In this respect, equal treatment of all property for which there are indices that have monumental values are considered justified, no matter of the present, formal status of protection.

If this principle is placed in the context of the long term horizon and potential vulnerability by climate changes, it is considered that priorities in the protection will have to be established (Cassar, 2005), even up to the decision about what will be protected and what we will have to abandon in the process of adaptation to climate changes.

- *The applicability of the principle on integral protection*

In accordance with the hitherto concept of protection, the spatial value is potentiated, which implies integral protection of the cultural and natural values of space, including immaterial heritage that bears different meanings and memories, which is an additional quality of the unique surrounding and identity. However, under the threat of climate changes, one more question appears now: whether and how it will be possible in the planning process and organization of space to coordinate treatment of natural, anthropogenic and immaterial heritage that jointly can potentiate total spatial value, if some of these elements are lost.

- *The applicability of the principle of authenticity*

The basic principle for the protection of natural and cultural heritage, general for all planning activities, is minimum changes in authenticity and minimum of interventions (for example, potentiating to the protection of both, the cultural property and its environment) The authenticity relates to shape, material, use, location, but also to

customs, the spirit of place and other immaterial symbols. Actually the authenticity of heritage is an evidence of the continual development of ambience as the key motivation to protect from any damage and destruction of fundamental values. The question that is raised here is how is it possible to apply this principle in the long term, under conditions of the unpredictable changes in environmental factors? This especially refers to the achievements in traditional architecture, which, as a bearer of identity, should be preserved in its original form (durability of roof covering, porosity of walls, resistance of building materials to abrupt changes in temperature, etc). Nevertheless, this relates to preservation of the historical settlement entities (villages, hamlets and selected assemblies) in their original environment and with the historical construction characteristics.

- *The applicability of principle to maintain the heritage as a developing resource*

The present approach to planning, emphasizes greater role of natural and cultural heritage in the development policy. It relates to finding the way to observe natural and cultural heritage in the context of economic activities and achievement of economic benefits, as well as the indirect effects to development of urban or rural community. The present profession accepted this principle of treatment the natural and cultural heritage as a developing resource and economic asset, as a step forward, contrary to the previous persuasion that conservation of heritage is a burden and obstacle for development in certain areas. However, under the pressure of climate changes, a question derives: Will the efforts of the social community on the protection of heritage represent the return to previous persuasion that conservation of heritage is an expenditure and not a profit for the society?

Just a few, the most evident dilemmas for reconsideration of the present valid principles in the protection and use of natural and cultural heritage are stated here, but they can become the turning point in further practice of spatial planning.

#### **4. INNOVATIVE APPROACH TO SPATIAL PLANNING – WHAT CAN BE DONE?**

How can the spatial planners identify potential risks of climate change significant for planners' decision making? Can the planners' decision made, significantly limit possibility of the others to adapt to climate changes? What adaptation to climate changes means in planning the national, regional and local development?

In order to answer these questions, it is necessary to develop new approaches to the spatial planning practice which will primarily, enable a high level of assessments about the climate risks to be undertaken, and secondly, to offer planning solutions for adaptation to climate changes in the future plans, without neglecting the efforts for their mitigation.

In this context, the adaptation for planners, would imply consideration of their development options in such a way to minimize future potential negative influence of climate changes, and at the same time, to make the most from the possibilities that climate changes might offer. That is the process of better understanding about how perhaps some decision on development option can be adapted in order not to trigger new sources of risks for climate changes (for example, the increase in temperature, more intensive precipitations, the higher incidence of droughts, etc). The planner's decision making in a general form, can be applied in case of climate changes providing that it is flexible enough to incorporate adaptive approach for monitoring the climate changes and necessity to reconsider the decisions according to the new, available information. Basically, this process consists the following phases:

- a) identification of problems and general aims;
- b) determination of criteria for decision making;
- c) selection of evaluation (receptors, units of exposition and critical points);
- d) risk evaluation; --> e) identification of options; --> f) evaluation of options;
- g) decision making (if the problem is correctly defined and criteria fulfilled);
- h) decisions implementation (enforcement of the adaptation measures);
- i) monitoring (follow up on effectiveness of measure to consequence of climate changes).

The individual phases in this process are graded, which enables identification, filtering, determination of priorities and establishment of climatic and non-climatic risks and options, before the start of more detailed risk evaluation and evaluation of planning variations. The aforementioned approach can select four levels and techniques for evaluation of influences to climate changes that can help to reach adequate measure for adaptation. (Willows, Connell (eds.), 2003; Dželebdžić, Bazik, 1999).

- |                              |      |  |
|------------------------------|------|--|
| a) determination of criteria | ---> | analysis of limit values/critical points   |
| b) selection of indicators   | ---> | mapping of limits /threshold of development /<br>for monitoring changes, setting standards<br>measures and setting the basic values. |
| c) risk evaluation           | ---> | technique of previous checking /screening  |
| d) evaluation of options     | ---> | projection of road maps / directions of decisions  |

Connecting individual phases of planning approach and the relevant phases in risk evaluation of climate changes, expresses how much is each level of risk evaluation overviewed and how much it can be used in decision making process. The task of the plan is to revitalize conflict of interests in space, i.e. to prevent heritage to be jeopardized in any way. In fact consideration of risk evaluation for the spatial planning level, through the presented planning process, contribute to:

- understanding what the change/adaptation means for spatial planning, having in mind the general aims and criteria for decision making – the result of this being mapping of limits and analysis of the critical points for possible risks:
  - analysis of hazard: mapping of the known spreading and types of hazards in a region;

- risk analysis: quantifying the probability of hazardous events of the given type and quantity of spreading;
- analysis of vulnerability/sensitivity of certain area: mapping the evaluated values of vulnerability of natural and cultural heritage to the certain hazard;
- evaluation of the risk level on the basis of checking/screening the potential options – which should show if detailed analysis of climate influence is needed;
- initial check of development option (evaluation of option) – the previous evaluation that should show how the suggested concept can be applied in practice.

The spatial planning possesses basic capacity to direct process to adaptation on climate changes, with the aim to transform towards climate-smart world by sectorial and territorial integration of strategies and present and future actions.

The new climate proof strategies of planning the sustainable and durable spatial development are necessary for investments in prevention of hazard consequences to climate changes and big expenses for its recovery. The extreme events in the last decade indicate the wide range of sensitivity and vulnerability of space and the necessity to increase its resistance and durability.

The approach that is favored in the last years, is the ecosystem approach and the concept of elasticity. The ecosystem approach represents integral management of land, water and live resources, promoting the protection and sustainable use in balanced ways and is based on the results of scientific researches (Naumann et al., 2011). The elasticity, as the adaptation to climate changes concept (Morecroft et al., 2012) means the quantity of disturbance that the ecosystem can bear without change in established process and structures, i.e. feedback time necessary to stable the condition after disturbance.

This knowledge influence the raising awareness about necessary action in the domain of adaptation to climate changes but still does not reach the priority position in the process of spatial planning (CLISP, 2011).

The key fields of climate-resistance planning and actions for space of natural and cultural heritage are:

- planning the ecological corridors and networking habitats - "It is important to increase the topographic diversity and landscape connectivity of protected areas by creating migratory corridors, to reduce or remove other stresses on the ecosystem and to strengthen risk preparedness, in particular for fires" (Bomhard, Midgley, 2005); accordingly, "landscape approach" concept of protection of heritage is considered to be the most relevant (Crnčević, 2013), especially the efforts to mitigate and prevent further fragmentation of landscape (Mittermeier, et al, 2004).

- management of natural disasters – more effective mapping of endangered regions; establishment of clear rules for land use in endangered zones; integration of climate change scenarios into the evaluation of danger and risk management;
- water management – implementation of the adequate protection measures against floods, conservation of the protected water areas, as well as the infrastructural network for irrigation and drainage; significant contribution would have maintenance and recovery of wetlands and riverbeds that have the role of natural barriers against floods (EC, 2009);
- the increment of elasticity of nature, natural values and the landscape itself to climate change influences through: increased number of protected spaces, enlargement of some protected space, provision of buffer zones around the protected spaces; maintenance or enlargement the heterogeneity of habitats at the landscape level; maintenance of diversity on species within communities; provision of functional connectivity within the protected spaces; establishment of potential refugial spaces (Morecroft et al., 2012);
- monitoring of cultural heritage and damage prevention - undertaking planning measure that integrally treat cultural and natural heritage; any cultural heritage has to be observed as vulnerable to climate changes; implement regular repairs and restorations of cultural heritage facilities; although it is not possible to prevent every damage, researches on methods for occasional avoidance of damages are of the outmost significance.

The planning and implementation of action within the aforementioned stated key fields in climate-resistant planning, primarily depends on improvement of the knowledge base and its availability to regional and local managements and all actors involved in the spatial planning process. The availability of risk zones and other adapted data and indicators that have integrated data on climate changes, represents the key prerequisite for adequate consideration at different levels. Preparing contracts between some countries and reaching regional agreements can lead to strengthening mutual measures at the global level. Of particular significance is to make fully transparent the enormous scope of uncertainty of the relevant climate indicators, different scenarios for climate changes and evaluation of possible consequences.

## CONCLUDING REMARKS

The work illustrates the spatial planning potential for adaptation to climate changes and indicates possible directions for decision making, as response to climate change but also possible ways for implementation in planning the protection of natural and cultural heritage. Also presented is the order of procedures that can be used in planning processes in order to more adequately consider possibilities for proactive adaptation to climate change influences in the process of evaluation of planning options. Accepting that the science on climate changes will develop further and that database with evidences on

climate impacts constantly increases, it cannot be expected that responses to all questions and replicable approaches and methods are found at once, but it can be counted on ideas aiming towards it. The qualitative indicators, information and relations are established and will help for the start up consideration of some of the long term influences of climate changes to planning decisions. At the same time, the work indicated the necessity to direct planning practice in direction towards integral and climate-resistant process of spatial planning and elaboration of spatial plans that will enable more successful adaptation to present, with mitigation and adaptation to uncertain, future climate changes.

The relocation of focus to the potential long term influences of climate changes, represents additional challenge for spatial planners who have to overview now how climate changes might influence their development options in the next 100 or more years. There were some thoughts in the past about the open, dynamic and complex systems as hypothetical creations that could present the complexity of spatial structure and daily living in them, as a reality and the process. Designing a model as an abstract presentation of the actual reality is, in the early stage of its application, qualified by statics and comparative balance, i.e. they were based on static theories and on tendencies of social systems to realize stable balance. Data from the certain time series were used. Predictions offered information on state of balance in a certain, future time period, while with dynamics of changes was operated in a given, known time frame. Today, we are witnesses of accelerated pace in technological development to the extent that even for the biggest forecasters it is a thankless task to offer presumptions how the world will look in the future, not even in the next fifty years. (Petruševski, Bazik, Dželebdžić, 2006).

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## SUMMARY

The planning practice so far, already has experiences regarding many forms of damage and threat to natural and cultural heritage as a result of industrial and urban development, as well as problems of their protection, development and use. A new potential threat in the form of climate change represents further uncertainty for the maintenance of these areas and a new challenge for spatial and urban planning. The knowledge of possible consequences to climate changes demands reconsideration of the fundamental conceptual setting, on the protection and use of natural and cultural heritage, in accordance with generally accepted aims and in accordance with the universally accepted standards, initially, considers preservation of identity, uniqueness and distinctiveness. Some of the issues that are discussed in this paper consider of climate-resistance planning and actions for space of natural and cultural heritage, in order to develop new approaches which will primarily, enable a high level of assessments about the climate risks to be undertaken, and secondly, to offer planning solutions for adaptation to climate changes in the future plans, without neglecting the efforts for their mitigation.