Oxidation Communications 39, No 1-I, 399–410 (2016)

European legislation

FLOOD RISK MANAGEMENT ANALYSIS FOR REDUCING HARMFUL EFFECTS ON HUMAN HEALTH, ENVIRONMENT, CULTURAL HERITAGE AND ECONOMIC ACTIVITY IN THE REPUBLIC OF SERBIA

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ABSTRACT

Catastrophic floods are the result of interaction of hydrological phenomena and natural processes, social and economic environment. Due to influence of climate change, such extreme hydrological phenomena will be more frequent. Destructive nature of water effects can cause human casualties, evacuation and damage to the environment; it can seriously endanger economic development and undermine economic activities. Therefore, maintaining of natural and economic balance must be primary goal which requires integrated approach to flood management. The latest flood events in Europe and especially catastrophic natural disaster in Serbia in 2014 lead us to conclusion that it is feasible and necessary to reduce risk of flood by practical combinations of measures in relation to the scope of disaster and degree of exposure to community. In this regard, one needs clear understanding of existing and potential flood risks in order to determine preventive reduction measures which represent approach to flood management. This work, on the occasion of increasingly frequent large scale of floods in Serbia and neighbouring countries in 2014, suggests that human responsibility and natural solutions are the best way to reduce the consequences of floods.

Keywords: floods, flood risks, flood risk management, environment, human health.

AIMS AND BACKGROUND

Water is source of life on Earth and it is one of the simplest and most widely used materials in nature whose physical and chemical characteristics are well known. Some of these characteristics are unique which is why water is so significant for life suste-

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nance on our planet. It is usually said that life actually originated in water and exists thanks to water. Hydrosphere, as only one part of the global ecological system, has enabled the emergence of biosphere. If we add up all the oceans, seas, rivers and lakes, water occupies a huge part of the Earth surface. The paradox is that only a small part of the enormous quantity of water is available to people in terms that it can be used for drinking and other purposes[1]. Total amount of water on our planet is estimated at about 1400 million km^3, out of which only 2.5% are fresh water; and even from that amount only 20% are conducive for human usage with a relatively small repair (cleaning and disinfection). Only 2.6 billion people on Earth have minimum sanitary conditions related to water supply, while about half population in developing countries suffer from diseases caused by defective drinking water[2]. Except for drinking, people need water to prepare food, for hygiene, as well as for many processes in industry and agriculture. In the world water consumption, agriculture has a share of 90%, while industry and households have 5% (Ref. 3). Chemicals play an important role in global economy and they are being used in many products[4]. Groundwater pollution occurs because of agricultural activities which involve usage of artificial manure[5]. Water is far the richest component of all living organisms and it is of fundamental importance in maintaining both structure and function of all tissues, e.g. cells as basic units of living matter. Not drinking water leads to death faster than not consuming food[6]. Not drinking water leads to death within a few days, after the body loses 10–20% of its total liquid volume. In case of not eating, life can be held for a few weeks, despite the loss of all body fat and about 50% of tissue proteins[7]. Water content in adult male is 60 ± 15%, and in women it is 55 ± 15%, meaning that water is one of basic conditions for human survival and life on Earth. Depending on climate conditions, water consumption for human survival ranges from 3–12 l/day. Water is of great importance for life of animals. Water is primordial environment in which life arose, so it is understandable that there is mutual relationship, especially for the animals whose habitat is water. Water is found inside the animals bodies. Water content in animals bodies varies from 50–93%, while aquatic organisms have the highest water content[8]. Water is very important for plants. Aquatic plants are easiest to supply with water. Many useful substances are dissolved in water, so plants absorb them easily. However, plants on land can not reach water easily sometimes because they cannot drain it from the soil[9]. Integrated water resources management is a complex and difficult task which includes measures and activities aimed at maintaining and improving the water regime, providing required quantities of water of different qualities for various purposes, water pollution protection and protection from damaging effects of water. Regulation of water and protection from the harmful effects of water is one of three water activities and activities of general interest. Regulation of water includes the construction and maintenance of water facilities for water flow regulation (control objects) and works on the maintenance of stability of shores and riverbeds and maintaining its bandwidth usage for water, ice and drift. Protection against harmful effects of water includes works and measures on flood protection from external and internal

water and ice, protection from erosion and torrents and works to eliminate the adverse impact of floods on water facilities and large water troughs[10]. Risk management from harmful water effects includes development of a preliminary assessment of flood risks, elaboration and implementation of flood risk management, general and operational plans for flood protection, the implementation of regular and emergency flood protection and protection against erosion and flood[11]. The thought that man can conquer nature has always been denied by natural disasters. Recent floods on the territory of the Republic of Serbia and neighbouring countries tell the opposite. People usually say that floods caused by rivers are natural phenomena like blood circulation in humans, and flood damages are humans deed. The economic losses based on catastrophic events, from 1970 to the beginning of the 90s of 20th century, increased at an average rate of 22.3%, which accounted to 22 billion US dollars average per year. Unlike the average growth rates of economic damages, the average annual growth rate of damage from the 90s of 20th century to 2013 was 31.2%, and their average annual amount reached even 147 billion US dollars (Ref. 12). There has been more than a hundred years of traditional flood defense, billions of dollars spent on technical approach and floods still continue to bring large-scale disasters. Is it proof of irresponsibility and ineffectiveness of modern man in conjunction with the lack of understanding of complex hydrology and dynamics of rivers, due to the impact of global climate change? It probably is. That is why people today speak more and more about water management as one of the most important challenges the world is facing, including the Western Balkan region, especially after the devastating floods in 2014. These catastrophic events, especially in Serbia, warn us how essential working on designing and implementing effective policies and programs for disaster risk reduction are, by presenting accurate, appropriate and customised information on losses, hazards, vulnerable aspects and risks. According by the National Strategy for protection and rescue in emergency situations, in Serbia between 1900–1940 years, 100 natural disasters occurred in a decade alone. The growth rate of these natural disasters increased from 1960 to 1970, when it was almost seven times higher, and from 1980 to 1990 up to 2000 natural disasters hit Serbia. From 1990 to 2000, the number of natural disasters in Serbia has increased to 2800 (Ref. 13). The floods were estimated to have caused effects that are equivalent to 2.7% of GDP in damages and to 2% of GDP in losses in 2014. The hardest hit economic sectors were energy, mining, and agriculture but significant damages were also inflicted on transport infrastructure (roads, bridges and railways)[14]. Most of the world top scientists do not deny that by 2050, due to warming and sea level rise, rainfalls will be much heavier, winds will be stronger, and floods in the Old Continent will be more devastating and more often. There are disagreements only about predicting proportions of natural disasters. It is no news that by mid-century, waterbeds will pour out more often, but the news is that floods across the continent will be more connected to one another, as newly published researches show. So far, studies have been limited to individual river basins, but the study published in the specialised journal 'Nature Climate Change' indicates that the

outpouring of riverbed of one basin will hit a lot more other regions and basins across the Old Continent. Brenden Jongman from the Amsterdam University, the leading author of this multidisciplinary research indicates that in the analysis of changes in rain models was concluded that floods will become pan-European problem and that by the mid-century they will cause third of losses in national companies. For comparison, in the first 12 years of this century, as pointed out by this study, the average cost due to flooding in the EU amounted to about 4.9 billion Euros a year. Based on projections on the amount of rainfall in the following decades and with existing flood defense, the costs of the EU will increase to 23.5 billion Euros a year by 2050 (Ref. 15). Therefore it is not surprising that policy of the EU considering flood risk management occupies such an important place, based on several significant documents, whereby we shall refer to Directive 2007/60/EC on the assessment and management of flood risks. The most important guidelines of the Community European Law referring to water quality and quantity are those which govern basic waters and their tributaries, guidelines of European Electronic Network Data on qualitative and quantitative waters conditions and Guidelines on Public Participation in the Creation of Water Plans for Improving Water Conditions. In practice of legally guaranteed subjective environmental rights, the water rights guidelines are expected to enable judicial protection, i.e. access not only to administrative, but also legal way. There are numerous European guidelines that apply to all elements of environment, and accordingly to waters as well. Thus, a specific European guideline requests an opportunity to review public and private projects from the point of environmental tolerance. The Guideline on Environmental Liability for Preventing and Remedying Environmental Damage is of great legal significance. The Regulation on Free Access of Organisations to the System for Ecological Management and Testing Ecology Functioning is also important (EMAS, I–III). Guidelines of European law in the field of ecology are landmarks for the implementation of common environmental objectives into national law[16]. Directive 2007/60/EC on Flood Assessment and Management[17] aims to establish a framework for assessing and managing flood risks to reduce the adverse impact of floods in community for human health, environment, cultural heritage and economic activity (Article 1). The term ‘flood’ means temporary covering by water of land not normally covered by water. These include floods from rivers, streams, torrential streams, and floods from the sea in coastal areas, etc. According to it, the ‘flood risk’ means the combination of probability of flood events and the possible harmful consequences of flood events on human health, environment, cultural heritage and economic activity.

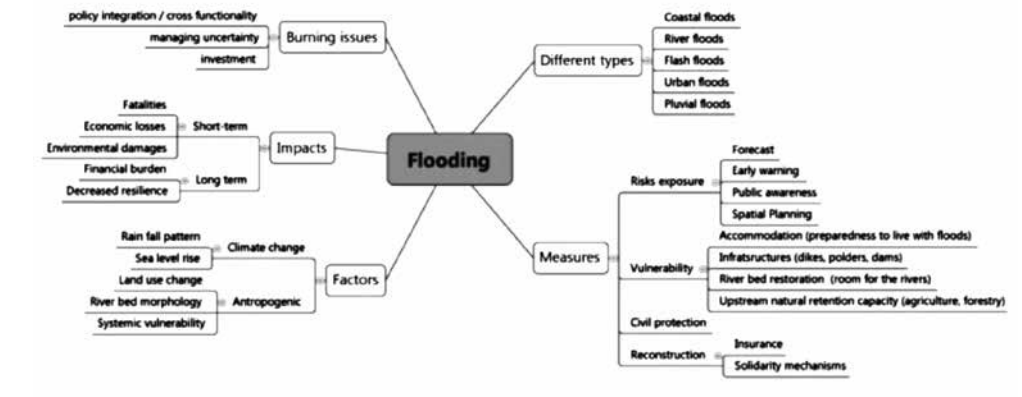

Fig. 1. Flood risks management in the EU (Ref. 18)

On the graph shown (Fig. 1) is clear that there are different types of floods, starting from coastal, over river, rain and other subtypes which depends on its strength in the short term, fatal injury, economic loss, damage to the environment and the financial crisis losses, while in the long term it can all be multiplied. Factors that cause it are numerous, ranging from climate change to the ones directly created by human. Adequate access to prevention, both in the segment of preventing floods, providing funds, which eliminate the causes of flood, and monitoring of the same by experts; certainly, harmful consequences of flooding can be reduced, but the emphasis is on a series of measures such as informing the population, sounding critical points, civil protection and reconstruction by insurance and social responsibility. Directive 2000/60/EC of the European Parliament and of the Council of 23rd of October 2000 which lays down the framework for action in the field of water policies[19] requires the management plan for each river basin in order to achieve good ecological and chemical status, which will contribute to mitigate the effects of flooding; the more so, because floods are one of the most widespread climatic hazards and risks to human health, environment and economy. Given the possibility that the danger of flooding could increase as a result of climate change, the Directive stipulates that it is necessary to make timely integrated strategic assessment of flood risk. Solvency II (Directive 2009/138/EC) – as amended by Directive 2014/51/EU ('Omnibus II') – replaces 14 existing directives commonly known as 'Solvency I'. The Solvency II Directive is an EU Directive codifying and harmonising the EU insurance regulation. Primarily this concerns the amount of capital that EU insurance companies must hold to reduce the risk of insolvency. Often called 'Basel for insurers', Solvency II is somewhat similar to the banking regulations of Basel II (Ref. 20). The Solvency II Directive had to be transposed by Member States into national law before 31 March 2015. On 1 April 2015, a number of early approval processes were start, such as the approval process for insurers internal models to calculate their Solvency Capital Requirement. The Solvency II regime will become fully applicable on 1 January 2016. This timeline – in parallel with EIOPA set of guidelines

on preparing for Solvency II – allows supervisors and undertakings to prepare for the application of the new regime. In addition, Solvency II includes a number of measures to ensure a smooth transition from Solvency I, mostly: two measures on the valuation of technical provisions, helping the transition to a market-consistent regime over 16 years; tolerance for insurers breaching the Solvency Capital Requirement within the first two years; grandfathering of existing hybrid own-fund items that are eligible under Solvency I, making it easier to meet the new capital requirements and giving the industry 10 years to adapt the composition of its capital to Solvency II standards and longer deadlines to report quarterly and annual information to supervisors and to disclose reports to the public, decreasing gradually from 20 weeks to 14 weeks after the close of the reporting period over the first 3 financial years[21]. Only the most senior tranches may qualify for the favorable capital treatment of high-quality securitisation positions. These senior tranches provide credit enhancement, in other words, their credit risk is lower than the credit risk in the entire pool of underlying exposures. It makes sense from an economic point of view that risk factors for high-quality senior securitisation positions are no higher than those applicable to the underlying securitised exposures if they were held directly by insurers.

RESULTS AND DISCUSSION

The fact is that because of the dramatic consequences of climate change, we need to adapt not only to warmer summers, but also to possible natural disasters, major storms and heavy rains. We are being witnesses that in certain places the amount of rainfalls in an hour is proportionate to the amount of the same in a month. In such situations, small streams can be transformed into powerful torrents. The catastrophic floods that have afflicted Serbia in 2014 probably could not be completely avoided. In fact, there is no total safety from the dangers and possible damage, and it probably will not exist in the future either. Despite the experience of human resources and modern equipment, it may not be successfully synchronised to operate at multiple-hit places. However, it is definitely possible to regard the timely implementation of precautionary measures, in order to keep the flood consequences under control. This has been confirmed by the experiences from recent years, showing that it is very important that the residents of affected areas estimate the risks and as soon as possible take measures to protect themselves from the flood risks. Cyclone 'Tamara' (as meteorologists named it) spread in Central and South-Eastern Europe on 13th May 2014. It was spreading on a large horizontal surface with vertical thicknesses of up to 100 km through the entire troposphere. Saturation of air masses was about 100% and humidity was increased due to warm air from south and east. In support to the development of this field of low pressure was conducive to the physical and geographic specificity of the Balkan Peninsula. Centre of the cyclonic field was above Serbia and Bosnia and Herzegovina from 13th to 15th of May where a large amount of rainfall was extracted, the highest ever recorded since the water meteorological observations started. Weakening and

disappearance of cyclone started during the 16th of May (Ref. 22). Obrenovac in Serbia was mostly hit by the flood; it is estimated that 90% of the settlements were submerged. The entire settlement of about 8700 inhabitants was evacuated[23]. The Power Plant 'Nikola Tesla', the largest thermal power plant in Serbia which provides nearly 50% of electricity for the country, is nearby Obrenovac. However, it remained afloat thanks to good interventions. The Thermal Power Plant Kostolac which provides 11% of electricity in Serbia was endangered by the outpouring of the river Mlava. Many other towns were threatened and flooded: Paracin, Petrovac, Bela Palanka, especially Krupanj, where structures were threatened by floods and landslides. The flood wave on the river Sava near Sabac reached the corner of 6.6 m, which is the highest level of the river in the city since records have been kept. The emergency on the entire territory of the Republic of Serbia was in force from 15th to 23rd of May. During the nine days of fighting against flood, the water element in the territory of the country caused total damage estimated at one billion and 532 million Euros. The floods have inflicted great damage to the energy sector whose repair takes more than 210 million Euros, while the amount of damage in the housing sector is estimated at 227 million Euros. Water and landslides have led to the complete destruction of more than 400 housing units and nearly 17 000 apartments and housing units suffered partial damage; 74 health care facilities were damaged, including clinics, health centres and clinics, as well as 35 nursery, elementary and secondary schools. The Government of the Republic of Serbia, according to the official methodology for assessing needs of the EU, the UN and the World Bank, from 10th of June to 10th of July 2014 drew up an assessment report on the needs for recovery and reconstruction of the flooded areas[24]. In Serbia, according to the World Food Program of the UN, about 600 000 of its citizens out of 7.2 million people were affected by the consequences of flooding after heavy rains, the hardest in the Balkans in the last 120 years (Ref. 25). According to the Government of the Republic of Slovenia, there were found 51 victims and an enormous number of birds were killed, therefore large-scale epidemic threatened because of the hundreds of tons of dead animals and estuary sewage.

Fig. 2. Obrenovac – flooded town[26]

Fig. 3. Consequences of flood in Krupanj [27]

Fig. 4. Reflection of the catastrophe which befell Serbia[28]

Figures 2, 3 and 4 show all flood horrors of biblical proportions, which occurred in Serbia in May 2014; they should certainly be reminders to take all possible measures to ensure that this situation does not happen again. The disaster did not bypassed countries in the region; a similar situation existed in Bosnia and Herzegovina[29]. Dozens of cities and villages were cut off from more than 2000 landslides. More than 100 000 people were evacuated, and it was the biggest exodus since the end of the 1992–1995 war. In neighbouring Croatia, thousands of people were evacuated along the Sava River[30]. As in many other disastrous situations, quite rightly raises the question if the human factor is to be blamed, was the flood risk managed adequately? Perhaps because of the extremely heavy rains caused by the static cyclone above this part of Europe, the disastrous floods could not be prevented; though if people reacted on time and invested into prevention, the consequences would have been less. It is simply incomprehensible that people in Obrenovac, in spite of pledges by the Republic Hydro-meteorological Service expected the catastrophe without prepared sandbags.

In fact, three days before the disaster, namely on 13th of May 2014 were forecasted heavy rains and rising water levels in the rivers. Serbia which aspires to EU membership must harmonize its legislation with European standards in all spheres, including water management, development and use of water and water protection. The Law on Water of the Republic of Serbia[31] regulates the legal status of waters, integrated water management, management of water facilities and water land, resources and funding of water activities, supervision of the implementation of this law, as well as other issues of importance to water management. Also, under this Act, the competent Ministry issued the Ordinance on Determining the Methodology for Making a Preliminary Assessment of Flood Risks[32]. Article 2 of this Ordinance, a preliminary assessment of flood risks was made to assess existing or potential flood risk, based on the available data on floods from the past and analysis of long-term tendencies that affect the level of flood risk, including climate change. Preliminary assessment of flood risks considered significant flooding in the past, the likelihood of similar flood events in the future, the potential adverse consequences of future floods and maps showing the available data. The potential adverse consequences of future floods to human health, the environment, cultural heritage and economic activity were estimated based on topography, type and land use, hydrological characteristics of the channel, the effectiveness of flood protection, the position of populated areas and areas of economic activity, long-term development plans and the impact of climate change (Article 7). Harmonisation of national regulations of the Republic of Serbia with the EU regulations implies the respect and complies with the provisions of Directive 2007/60/EC on the assessment and management of flood risks. In accordance with Community legislation, Member States are obliged to make the preliminary risk available to the public, flood hazard maps and flood risk management plans, and to encourage the active participation of stakeholders in the production, review and updating of the flood risk management plans (Article10). It is indisputable that, as in many other areas, this important segment is an evident gap between the normative and real, both at the EU level and at the level of individual countries. Regulations are being made, and one can say that they adequately reflect the essential content and the real state of things. However, the problem is in their unenforceability and in high degree of tolerance towards persons and organisations for the damage they make to the community, the health of people and the environment, their irresponsibility, whether by their acting or omission of acting. Since the consequences of catastrophic risk are very large, and can be fatal for the society, practice introduced two basic models, with more variations, by which the state struggles with the consequences of catastrophic risks. In the first model the state does not participate in the coverage of damage incurred as a result of catastrophic events, but the damages are covered by contractual insurance. This type of model is applied to countries with highly developed infrastructure and a market economy and countries without significant natural disasters such as earthquakes, tornadoes, and all under the condition that the insurance industry is highly developed, what is one of the main conditions for implementation of Solvency II. In terms of implementation costs,

the one-off net cost of implementing Solvency II for the whole EU insurance industry has been assessed to be around EUR 3 billion to EUR 4 billion, which is relatively small compared to the annual turnover of the sector (around EUR 1.1 trillion of written premiums). In terms of capital requirements, taking into account the so-called 'long-term guarantees package' in the Omnibus II Directive, the aggregate available surplus (free own funds above the capital requirements of each insurer) is likely to be broadly identical to the aggregate situation under Solvency I. However, the distribution of capital requirements across undertakings will reflect more accurately individual risks, leading to a more efficient allocation of capital in the EU (Ref. 34). Unlike the first, in the second model, the states directly or indirectly participate in the resolution of claims incurred, despite the existence of contractual insurance. Characteristic of this model is that the state after the manifestation of catastrophic events and determining the cause and extent of damage and claims of subjects who suffered damage intervenes from its budget to reverse the consequences arising from the manifestation of these risks. A variation on this model involves the establishment of special insurance organisations that are state-owned through direct insurance or reinsurance; affect the creation of special funds from which they compensate the damage, as for example in France, in the USA and Japan[33]. The main source of the EU law which establishes certain rules in the field of criminal responsibility is Directive 2008/99/EC on the protection of the environment through criminal law which lays down the measures that Member States should undertake in the field of criminal law in order to effectively protect the environment which in practice almost has no purpose, because the criminal liability as a rule is absent or only in exceptional circumstances applied.

CONCLUSIONS

The unprecedented water floods in Serbia, in addition to large-scale disasters, brought a number of important lessons in the context of flood risk management. Firstly, the management of flood risks should be carried out in a timely and responsible manner, while the defense systems on the rivers must be strengthened, so the water apocalypse would not be repeated. It is necessary to restore the existing systems as soon as possible to the normal state, so cut up levees could not be beaten again by less water, and in order to make all these activities successfully, they must follow the solutions of those countries that have shown the most experience in flood protection. Except the so-called 'rabbit levees', they should also use mobile metal barriers as defensive equipment designed for shorter sections which have several advantages because they can be installed in very short time to prevent water penetration. Mobile fence can be practically hung on the previously installed metal posts. It is possible to install metal wall with a length up to 400 m in a day. When the flood is over, fence can be uninstalled and put in storage. However, the safest solution is to maintain a stable defense system. Unfortunately, in some parts of Serbia strong defense systems were not built because the floods were rare. In many places, the flood protection systems

are neglected. It is impossible to move around the dikes in these neglected places. Weed covers large areas, so the critical points of the embankment are unobservable, which slows timely response. Likewise, we should consider the type of flooding since the lowland rivers are easily tamed for their level rises slowly, while the mountain, torrential rivers rise rapidly and there is no much time for reacting. In the mountain areas of Serbia we should develop and strengthen active flood system to keep water in the top part of the course, to build dams followed by the next level of defense – embankments. However, above all it is necessary to determine the responsibility of individuals for negligent and unprofessional performance at work, which contributed to the suffering of people and material damage of huge proportions. Unfortunately, this kind of reaction in Serbia has failed. Finally, the complete harmonisation with EU legislation, especially implementation of Solvency II and consistent application of regulations, preventive measures and investments in systems for flood protection and flood prevention measures should be a priority task, as well as ensuring public participation in water plans in terms of network records of quality and quantity of the state of primary waters. But first of all, our society has to make strong confidence of our citizens regarding benefits of insurance and to develop their customs to conclude insurance agreements. All the more so, because it is necessary to invest a lot of money to repair the damage caused by floods, and many times less to build good defense systems that would help to significantly limit the losses.

REFERENCES

1. http://water.usgs.gov/edu/earthhowmuch.html, visited on 01.07. 2015.
2. http://www.epa.gov/region1/students/pdfs/ww_intro.pdf, visited on 31.05. 2015.
3. http://water.org/water-crisis/water-facts/water/, visited on 28.05. 2015.
4. Z. BJELAJAC, M. DUKIC MIJATOVIC, V. KOZAR: Review of the Uncontrolled Use of Certain Chemicals and Their Adverse Effect on Human Health and Safe Environment. Oxid Commun, **35** (2), 722 (2015).
5. Z. BJELAJAC, M. POCUCA, M. DUKIC MIJATOVIC, M. MARKOVIC: The Current State of Pollution of Water, Soil and Air in the Republic of Serbia with Overview to the Importance of Industrial Ecology. Oxid Commun, **35** (4), 1049 (2012).
6. M. MILIVOJEVIC, S. RADAKOVIC: Water on Planet Earth on http://www.vma.mod.gov.rs/sr/lekarski-saveti/vodnaplanetizemlji#.VbaF3bOqpBc visited on 25.07.2015.
7. http://ekologija.ba/index.php?w=c&id=, visited on 28.07.2015.
8. http://waterfortheworld.net/index.php%3Fid%3D12 visited on 05.07.2015.
9. S. BELIC, A. BELIC, M. RAJKOVIC: Plants' Influence on Preserving Water Quality in Drainage Canals. Yearbook of the Faculty of Agriculture, **31** (1), page 90–97 (2007).
10. T. HANAK, J. KORYTAROVA: Zones of Risk in Terms of Security – Comparison of Floods, Snow, Stormy Winds and Hailstorms. J Appl Eng Sci, **12** (2), 137 (2014).
11. J. PERINIC, R. MIKAC, P. VITAS: Floods – Challenges that Require Change in the Discourse of Action. Security (Belgrade), **56** (3), 98 (2014).
12. J. KOCOVIC: Risk Management in the Insurance Market of Serbia (2014) from http://aktuar.rs/XII/1.ppt. p.7 visited on 05.11.2015.
13. I. PAVLOVIC: Insurance against Natural Disasters. The World of Insurance, (3), (2012).
14. http://ec.europa.eu/enlargement/pdf/.../floods/20140715-serbia-rna-report.pdf, visited on 05.11.2015.

15. http://www.nature.com/nclimate visited on 26.07.2015.
16. J. SALMA: The Legal Instruments for Protection against Waters (Floods and Drought) and Water Protection. Proceedings of the Faculty of Law, Novi Sad, **47** (3), 27 (2013).
17. Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the Assessment and Management of Flood risks (OJL, 288, 6.11.2007, pp.27–34).
18. http://waterissues.eu/tag/floods/ visited on 18.07.2015.
19. OJ L 327, 22.12.2000, p.1 Directive was amended by Decision No 2455/2001/EC (OJ L 331, 15.12.2001, p. 1.
20. http://treasurypeer.com/dummies-2/solvency-iifordummies/#sthash.9pNUl2cw.dpuf, visited on 06.11.2015.
21. https://www.ashurst.com/doc.aspx?id_Content=12078, visited on 06.11.2015.
22. http://serbianmeteo.com/ciklon-koji-je-usao-u-istoriju-ciklon-tamara-13-16-maj-2014/ visited on 18.05.2015.
23. http://www.cnn.com/2014/05/19/world/europe/balkans-flooding/ visited on 20.05.2015.
24. http://www.srbija.gov.rs/vesti/specijal.php%3Fid%3D209591 visited on 20.06.2015.
25. http://www.rs.one.un.org/organizations//UN%2520Floods-FINAL%252010.pdf visited on 01.07.2015.
26. www.rtv.rs/.../baric-evakuisan-u-obrenovcu-spasavanja-i-tok/4/06/2015 visited on 21.07.2015.
27. www.dw.com/23/06/2015. visited on 21.07.2015.
28. http://www.tvbest.rs/52819-samo-da-prezivimo-pas-pliva-u-bujici-maca-mu-na-ledjima/1/06/2015 visited on 22.07.2015.
29. M. NOGIC, M. SCIBAN, M. SAVIC, B. JOLOVIC: Water Quality at the Source in the Municipality Laktasi, Bosnia and Herzegovina. Oxid Commun, **35** (4), 1065 (2014).
30. http://www.duzs.hr/page.aspx%3FPageID%3D677, visited on 19.07.2015.
31. Law on Waters ('Official Gazette' No 30/10 and 93/12).
32. http://www.rdvode.gov.rs/lat/uredjenje-vodotoka-pp-rizika-poplava.php visited on 23.07.2015.
33. http://europa.eu/rapid/press-release_MEMO-15-3120_en.htm, visited on 07.11.2015.
34. http://www.insuranceage.co.uk/insurance-age/news/1184849/european-insurers-expect-modest-cost-solvency-ii-compliance, visited on 07.11.2015.

Received 13 August 2015
Revised 12 October 2015

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ORGANISATION

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2. M. B. NEIMAN, D. GAL: The Kinetic Isotope Method. Akademiai Kiado, Budapest, 1971.
3. F. SHAHIDI: Natural Antioxidants: Chemistry Health Effects and Application (Ed. F. Shahidi). AOCS Press, Champaign, Illinois, 1997.
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