



# KAKO POBOLJŠATI PROJEKTOVANJE I RAD BUNARA ZA ZAHVATANJE PODZEMNIH VODA ZA VODOSNABDEVANJE U PODRUČJIMA POD RIZIKOM OD POPLAVA

## HOW TO IMPROVE THE DESIGN AND OPERATION OF GROUNDWATER ABSTRACTION WELLS FOR DRINKING WATER SUPPLY IN AREAS AT RISK OF FLOODING

### REZIME

U radu su prikazani rezultati istraživanja obavljenih za potrebe kompanija koje su odgovorne za vodosnabdevanje u cilju povećanja sigurnosti i bezbednosti vodosnabdevanja u okolnostima stalnog povećanja razika od plavljenja, osvrtom na zahvatanje podzemnih voda bunarima. Pored onoga čemu se standardno posvećuje pažnja, direktne štete i prekidi napajanja električnom energijom, posebna pažnja posvećena je indirektnim štetama i rizicima od zagađenja i uticaja na zdravlje ljudi.

**Ključne reči:** rizik od poplave, vodosnabdevanje, water safety, bunari

### ABSTRACT

The paper presents the results of investigation conducted for water companies dealing with water supply, with the idea to improve their resilience to flooding of production wells. In addition to the standard concern about the infrastructure damage and power supply problems, an attempt was made to investigate the potential of the contamination of raw water and the aquifer by flood water and the associated health risk.

**Key words:** flood risk, water supply, water safety, production wells.

### UVOD

Sektor vodovoda i kanalizacije u svetu se suočava sa velikim izazovima usled demografskih i klimatskih promena, kao i stalnih zahteva za povećanjem efikasnosti i održivosti sistema za snabdevanje vodom i kanalisanje. Poplave su najčešće prirodne katastrofe u Evropi.

Prema informacijama Evropske agencije za zaštitu životne sredine (EEA, 2012) na stotine rečnih poplava je zabeleženo u Evropi u poslednjih nekoliko decenija. Očekuje se da će globalno zagrevanje je povećati i veličinu i učestalost poplava u velikom dijelu Evrope. Međutim, sve te procene su prilično neizvesne.

U maju 2014. godine region Balkana je bio pogođen intenzivnim padavinama (najveće zabeležene u poslednjih 120 godina), što je dovelo do katastrofalnih poplava. Srbija je najviše pogođena ozbiljno, sa nekoliko velikih gradova u centralnom regionu potpuno potopljenih, i aktiviranim klizištima u planinskim predelima (slika 1). U BiH, posebno u Republici Srpskoj, takođe je poplavljen veliki prostor. I u istočnoj Hrvatskoj i južnoj Rumuniji poplave su izazvale velike štete, a bilo je i ljudskih žrtava, dok su Austrija,

### BACKGROUND

The water and wastewater sector worldwide is facing huge challenges, driven by demographic and climatic changes, as well as pressures for more efficient and sustainable solutions for water supply and sanitation services. River floods are the most common natural disaster in Europe.

According to information of the EEA (2012) hundreds of river floods have been reported for Europe in the last decades. Global warming is projected to increase the occurrence and frequency of flood events in large parts of Europe. However, estimates of changes in flood frequency and magnitude remain highly uncertain.

In May 2014 the Balkan region was subject to intensive rainfall (the most severe recorded in the last 120 years), resulting in extensive flooding. Serbia was the most severely affected, with several major cities in its central region completely flooded, and landslides in mountainous regions (Figure 1). Bosnia, in particular its Republika Srpska entity, was also inundated to a crippling extent. Eastern Croatia and southern Romania also experienced flooding and human victims,

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