

Project title: EIT HEI Initiative Innovation Capacity Building for Higher Education

Activity: HEI INNOVATE – Sampling Training of PhD Students

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Objective of sampling

- The objectives of sampling and characterization of the samples are given in Table 1.

Table 1. Objectives of sampling and characterization of the samples

Objectives	Appropriate sample type	Appropriate test method	Type of assessment
Environmental Screening Assessment, which may include:			
Evaluation of the distribution of toxic substances into soil, sediments and surface waters	Samples of tailing / soil from the coastal area with content of the tailing, agricultural soil wetted with surface water, agricultural soil without influence of surface water	Chemical testing of toxic elements in soil sample	Comparison with national / international reference values
	Surface water samples	Chemical testing of toxic elements in surface water sample	Comparison with national / international reference values
Evaluation of the potential mobilization of toxic substances into groundwater	Groundwater samples from existing wells in Bor area (Slatina Village)	Chemical testing of toxic elements in groundwater sample	Comparison with national / international reference values
Evaluation of the potential impact on agricultural areas	Samples of agricultural soil with and without influence of surface water	Chemical testing of toxic elements in groundwater sample	Comparison with national / international reference values and with agricultural soil wetted with surface water

Importance of proper sample collection

- When collecting different water, sediment or soil samples, it is crucial that the sampling is done in a proper manner and with the appropriate equipment, so the field measurements and the results obtained in the laboratory will reflect the environmental conditions at the time of sampling.
- *On the Figure 1. is presented map of Serbian sample collection area*

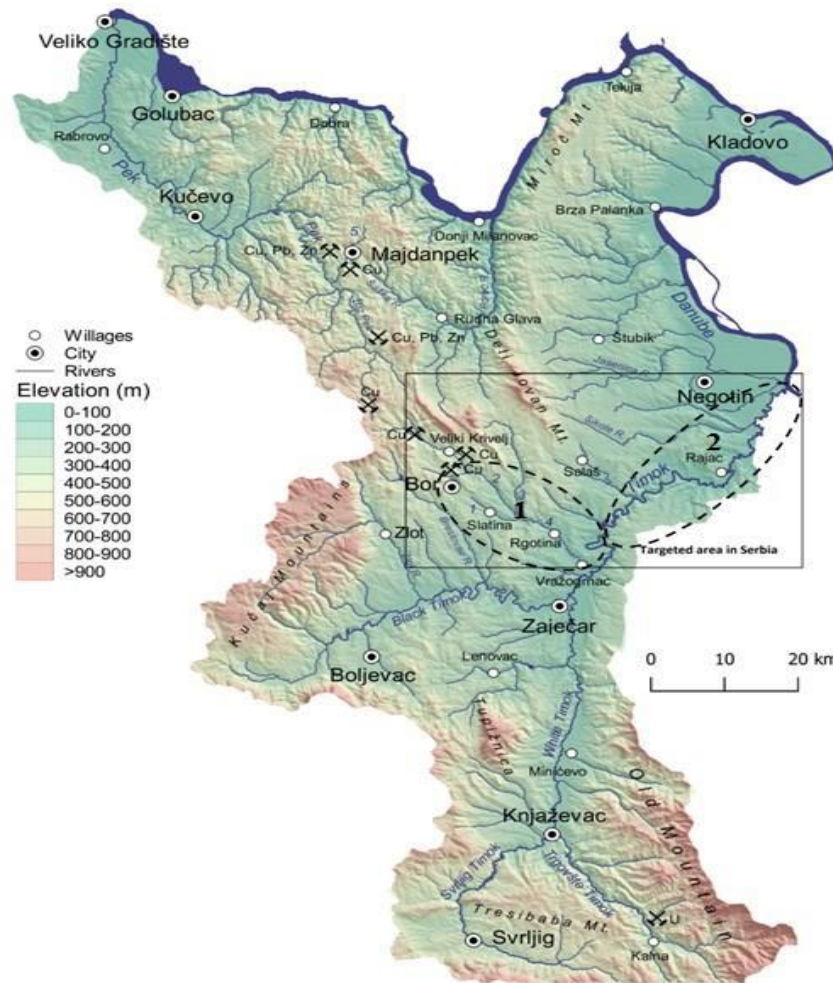


Figure 1. Map of Serbian sample collection area

Water sampling procedure

- The first step: rinse equipment for sampling three times with water which will be sampled.
- The aim of this step is to avoid cross-contamination, which may occur due to residual water from the previous sample.
- After the finish of the rinsing procedure, water sample can be taken by hand tool.
- In the next step: sampled water transfers to the plastic dishes, which also should be rinsed three times with sampled water, before filling.
- Sampled water from dish is transferring to the bottles for water storage.
- These bottles are already prepared in the laboratory, and no need to perform some procedure of preparation in the field.
- Filled two bottles exactly till 50 ml, because inside of bottles is present nitric acid for sample conservation.
- In the aim of quality control, it should be taken two samples of each water. One for analysis and another for reserve and quality control.

➤ *Figure 2 presents Sampling Protocol for water samples*



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Sampling Protocol - Water samples / Протокол Узорковања - Узорци Воде

Project / Пројекат: HEI4S3-RM ID: 1187		Name and identification of location/ Назив и ознака локације:		
Sampling date/ Датум узорковања:		Sampling point identification/ Идентификација тачке узорковања:		
GPS reading / ГПС позиција		N:	E:	Elev (m asl):
Type of sample/ Врста узорка	<input type="checkbox"/> Surfacewater/ Површинске воде <input type="checkbox"/> other / друго:			
Sampling method /Метода узорковања:	Sampling equipment / опрема за узорковање:			
Color / Боја				
Odor / Мирис				
Air temperature / Температура ваздуха [°C]				
Water temperature / Температура воде [°C]				
Redox potential / Редокс потенцијал [mV]				
pH-value / pH вредност				
DO (dissolved oxygen)/Растворни кисеоник				
Electric conductivity / Електропроводљивост [mS/m]				
Parameter for flow rate measurement	L (m)	D1 (m)	D2 (m)	D3 (m)
	W (m)	T1 (s)	T2 (s)	T3 (s)
	Dav (m)	Tav (s)	Flow rate (L/min)	
Preparation sample vessel / Припрема посуда за узорак	<input type="checkbox"/> No / не	<input type="checkbox"/> Acid/Киселина ml <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> HNO ₃ <input type="checkbox"/> HCl	<input type="checkbox"/> Bipyridine Solution	<input type="checkbox"/> Base/База ml <input type="checkbox"/> NaOH
Remarks / Напомена				
Name of sampler / Име узорковача:			Photodocumentation/ Фотодокументација: Y/N	

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Figure 2. Sampling Protocol – Water samples

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Soil sampling procedure

- For sampling soil from the river coasts, spatula samplers of different shapes are used.
- The spatula sampler should be decontaminated before each subsequent sampling.
- New gloves are always used to prevent sampling contamination for all new sampling.

➤ *Figure 3. presents Sampling Protocol for soil samples*



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Sampling Protocol - Soil / Протокол узорковања - Земљиште

Project / Пројекат: HEI4S3-RM ID: 1187		Name and identification of location/ Назив и ознака локације	
Sampling point / Тачке узорковања			
Coordinates / Координате	N:	E:	Elev. (m asl):
Sampling date / Датум узорковања:			
Depth / Дубина (m from to) (м од ...до)			
Soil characterisation / Карактеризација земљишта			
Colour / Боја			
Volume of Sample for Chemical Analysis / Запремина узорка за хемијску анализу		<input type="checkbox"/> 1 L <input type="checkbox"/> 2 L	
Remarks / Напомене			
Name of sampler/Име узоркача		Photodocumentation/ Фотодокументација: Y/N	

Figure 3. Sampling Protocol – Soil

Sediment sampling procedure

- For sampling sediments from the river that are not deep, spatula samplers of different shapes are used.
 - Boats and specially designed hermetically sealed samplers are used to sample sediments from the bottom of deep rivers.
 - The spatula should be decontaminated before each subsequent sampling.
 - New gloves are always used to prevent sampling contamination.
 - During sediment sampling, care should be taken to perform sampling from a place that is constantly covered with water. This is important because sediments located near the river coast, can due to the reduction of water in the river during the summer period, oxidize in contact with oxygen from the air, which can significantly affect their chemical and microbiological composition.
 - Sediments will be sampled from the bottom of the river from the depths 0-10 cm, with light movements of a spatula, which are then placed in a new zip-top plastic bag. If the samples are placed in already used plastic containers, the containers should be sterilized after thorough washing.
 - After sampling, the bag is immediately closed and placed in a dark shipping container (priorly cleaned and disinfected) and ensure the samples are not placed directly on ice packs to avoid freezing the samples.
 - Important parameters in situ are: name and identification of location, coordinates, sampling date, depth, sample characterization, color, volume.
- *Record the measured values in sampling protocol for sediment samples which is presented in Figure 4.*



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Sampling Protocol - Sediments / Протокол узорковања - Седименти

Project / Пројекат: HEI453-RM ID: 1187		Name and identification of location/ Назив и ознака локације	
Sampling point / Тачке узорковања			
Coordinates / Координате	N:	E:	Elev. (m asl):
Sampling date / Датум узорковања:			
Depth / Дубина (m from to) (м. од ... до)			
Sediments characterisation / Карактеризација седимената			
Colour / Боја			
Volume of Sample for Chemical Analysis / Запремина узорка за хемијску анализу		<input type="checkbox"/> 1 L <input type="checkbox"/> 2 L	
Remarks / Напомене			
Name of sampler/Име узоркивача		Photodocumentation/ Фотодокументација: Y/N	

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Figure 4. Sampling Protocol – Sediments

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