

Conference FORS2D – Perspectives of forestry and related sectors as drivers of sustainable development in the post-Covid era



## Soil erosion and torrential flood protection: education and practice in forestry

Nada Dragović, Mirjana Todosijević, Tijana Vulević, Katarina Lazarević

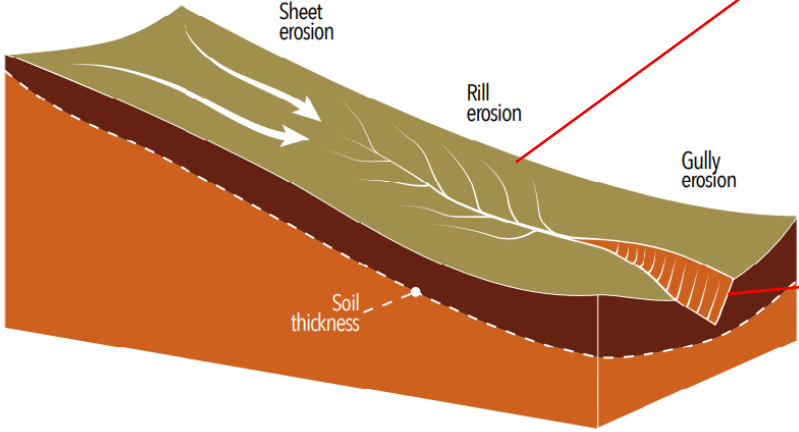
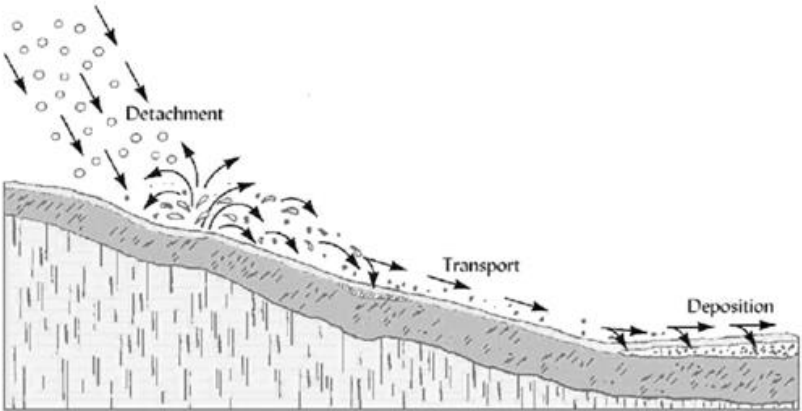
*University of Belgrade Faculty of Forestry*



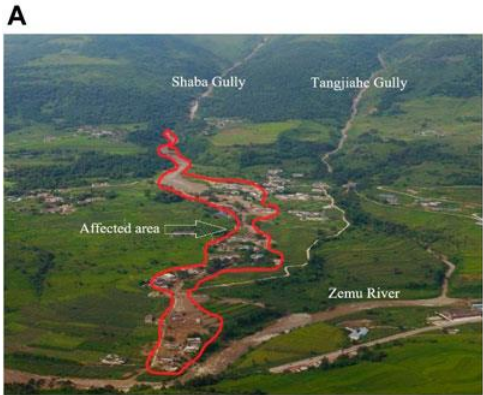
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# 1. Soil erosion and torrential floods



# 1. Soil erosion and torrential floods



## 2. Education of ETC experts in some EU countries



Education is a way to develop scientific knowledge of soil erosion and torrential floods.

Organised work on ETC started at the end of XVIII century.

## 2. Education of ETC experts in France

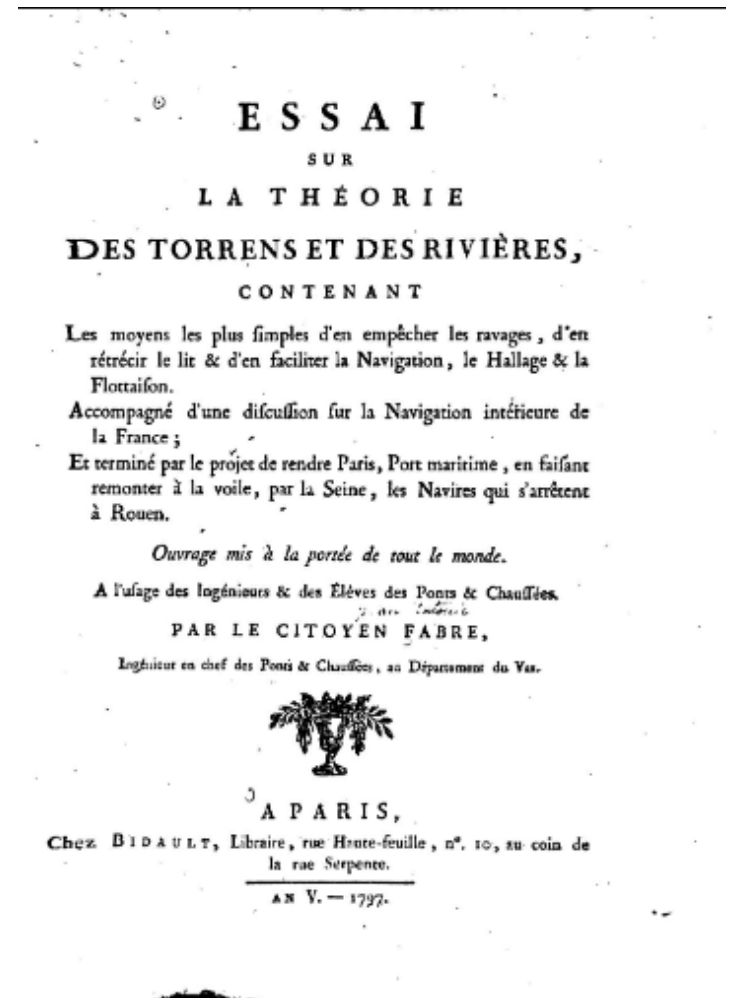


*Chronological analysis of management of torrents in France*

## 2. Education of ETC experts in France

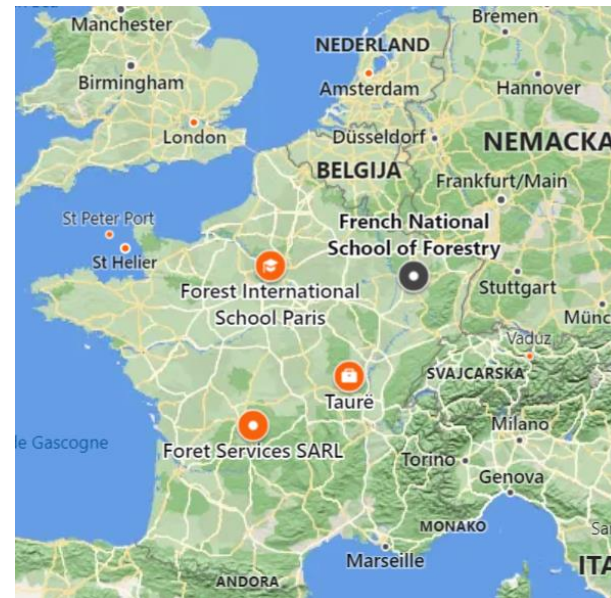
- Jean Antoine Fabre (1748-1834) geomorphologist, published a pioniring book that points out the importance of stabilising the source of sediments by reforestation.
- In 1797, Fabre highlighted the differences between rivers and torrents.
- Alexandre Surell (1813-1887) write „Study on the torrents of the Hautes Alpes“
  - 1st part of the book – high quality monograph of the origin of torrential activities
  - 2nd part of the book – pamphlet against deforestation on the slope

In 1841 Surelli identified tree main parts of torrent catchment.



## 2. Education of ETC experts in France

- 1824 The French National School of Forestry, Nancy (the first national training institute for foresters in France)



## 2. Education of ETC experts in Austria

### Austria

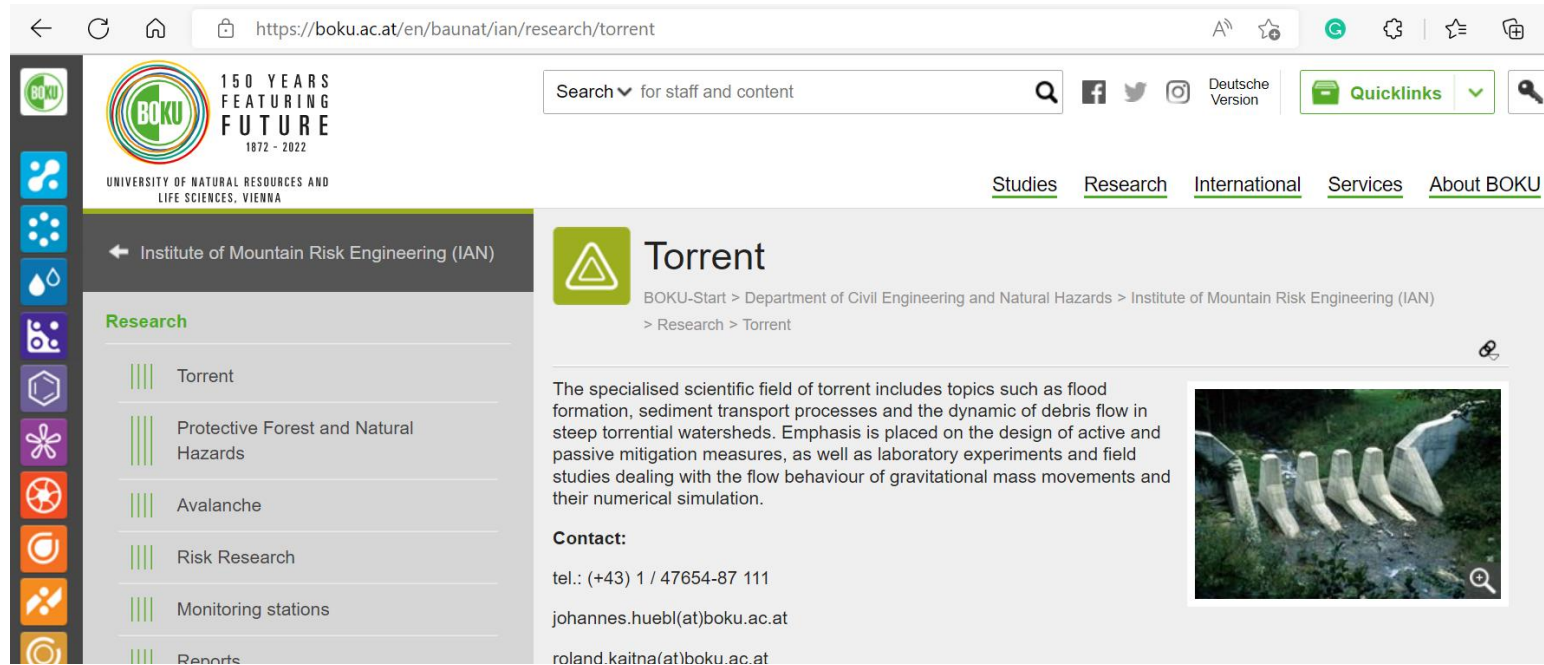
- 1884 State service for torrent control
- Forest Engineering Service on Torrent and Avalanche Control
- 1897 compulsory subject: “Afforestation and torrent control in mountainous regions” at the BOKU, Vienna





## 2. Education of ETC experts in Austria

### Austria



The screenshot shows a web browser displaying the BOKU website. The URL is <https://boku.ac.at/en/baumat/ian/research/torrent>. The page features the BOKU logo and a search bar. The main content area is titled "Torrent" and includes a description of the specialized scientific field, contact information, and a small image of a concrete structure in a stream.

**150 YEARS FEATURING FUTURE 1872 - 2022**  
UNIVERSITY OF NATURAL RESOURCES AND LIFE SCIENCES, VIENNA

Search for staff and content

Deutsche Version Quicklinks

[Studies](#) [Research](#) [International](#) [Services](#) [About BOKU](#)

Institute of Mountain Risk Engineering (IAN)

**Research**


- Torrent
- Protective Forest and Natural Hazards
- Avalanche
- Risk Research
- Monitoring stations
- Reports

### Torrent

BOKU-Start > Department of Civil Engineering and Natural Hazards > Institute of Mountain Risk Engineering (IAN) > Research > Torrent

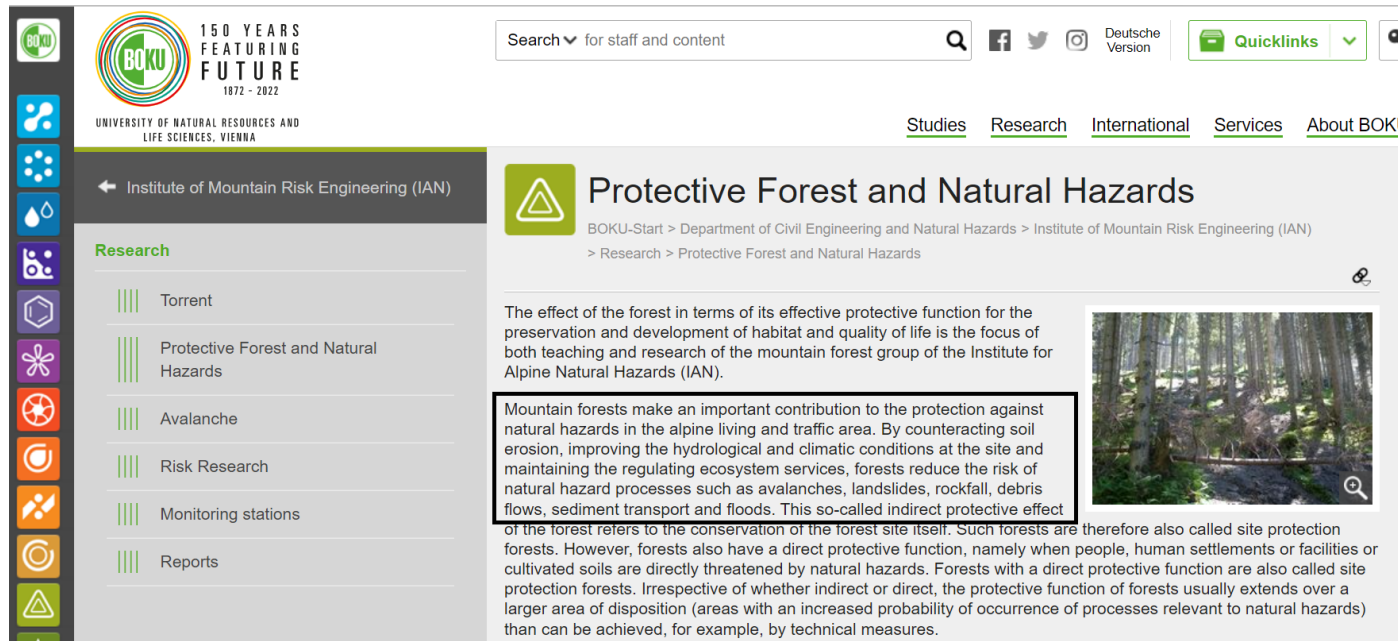
The specialised scientific field of torrent includes topics such as flood formation, sediment transport processes and the dynamic of debris flow in steep torrential watersheds. Emphasis is placed on the design of active and passive mitigation measures, as well as laboratory experiments and field studies dealing with the flow behaviour of gravitational mass movements and their numerical simulation.

**Contact:**  
tel.: (+43) 1 / 47654-87 111  
johannes.huebl(at)boku.ac.at  
roland.kaitna(at)boku.ac.at



## 2. Education of ETC experts in Austria

### Austria



The screenshot shows the website of the Institute of Mountain Risk Engineering (IAN) at BOKU. The header includes the BOKU logo with '150 YEARS FEATURING FUTURE 1872 - 2022' and the text 'UNIVERSITY OF NATURAL RESOURCES AND LIFE SCIENCES, VIENNA'. A search bar is present with the text 'Search for staff and content'. Social media icons for Facebook, Twitter, and Instagram are visible, along with a 'Deutsche Version' link and a 'Quicklinks' dropdown menu.

The main navigation menu includes: [Studies](#), [Research](#), [International](#), [Services](#), and [About BOKU](#).

The page title is 'Protective Forest and Natural Hazards'. The breadcrumb trail is: BOKU-Start > Department of Civil Engineering and Natural Hazards > Institute of Mountain Risk Engineering (IAN) > Research > Protective Forest and Natural Hazards.

The left sidebar shows a 'Research' menu with the following items:

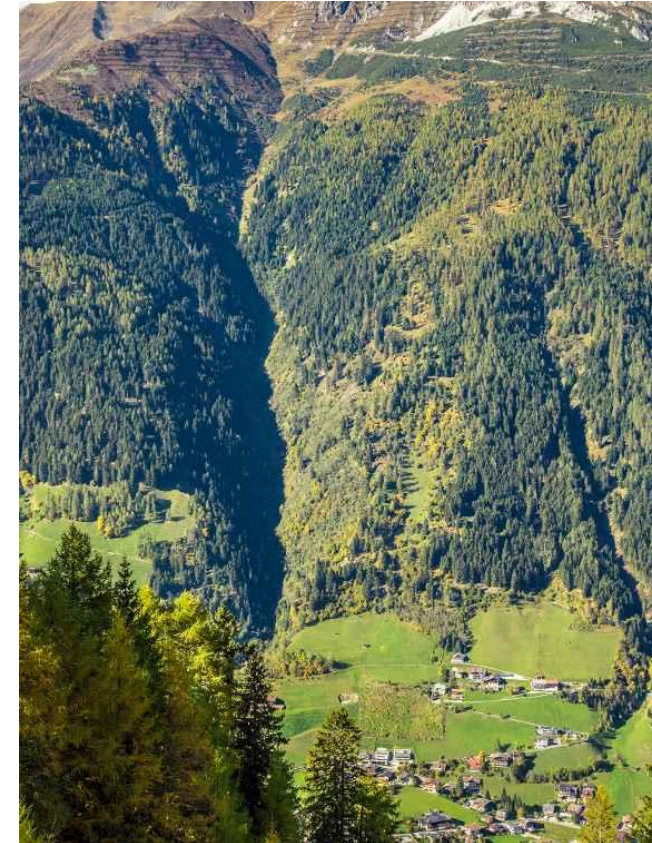
- Torrent
- Protective Forest and Natural Hazards
- Avalanche
- Risk Research
- Monitoring stations
- Reports

The main content area features a green triangle icon and the title 'Protective Forest and Natural Hazards'. Below the title, a text box explains the forest's protective function:

The effect of the forest in terms of its effective protective function for the preservation and development of habitat and quality of life is the focus of both teaching and research of the mountain forest group of the Institute for Alpine Natural Hazards (IAN).

**Mountain forests make an important contribution to the protection against natural hazards in the alpine living and traffic area. By counteracting soil erosion, improving the hydrological and climatic conditions at the site and maintaining the regulating ecosystem services, forests reduce the risk of natural hazard processes such as avalanches, landslides, rockfall, debris flows, sediment transport and floods. This so-called indirect protective effect of the forest refers to the conservation of the forest site itself. Such forests are therefore also called site protection forests. However, forests also have a direct protective function, namely when people, human settlements or facilities or cultivated soils are directly threatened by natural hazards. Forests with a direct protective function are also called site protection forests. Irrespective of whether indirect or direct, the protective function of forests usually extends over a larger area of disposition (areas with an increased probability of occurrence of processes relevant to natural hazards) than can be achieved, for example, by technical measures.**

An image of a forest landscape is shown to the right of the text.



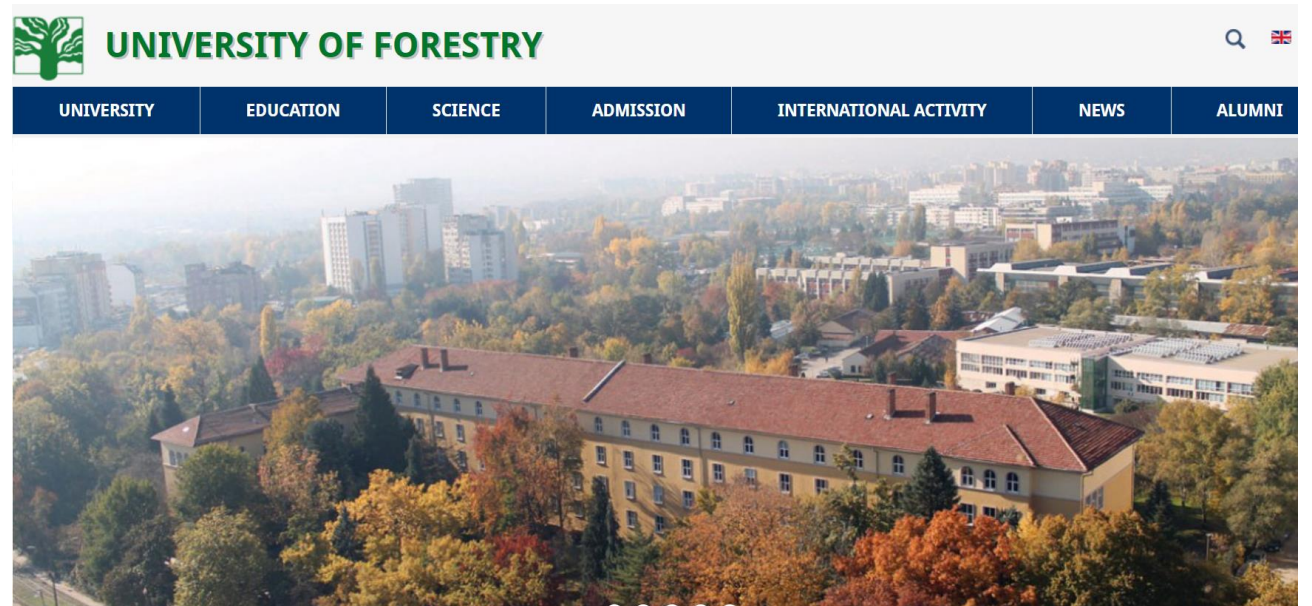
## 2. Education of ETC experts in Bulgaria

### Bulgaria

- 1905 the first Section of torrent control formed in Bulgaria
- French system for ETC
  
- 1923 Faculty of Agronomy at Sofia University „St Kliment Ohridski“
- 1945 Department of Forestry in Faculty of Agronomy and Forestry
- 1953 University of Forestry, Faculty of Forestry, Sofia

BSC subject: Protection against erosion and floods

MSC elective subject: Torrential catchment management



## 2. Education of ETC experts in North Macedonia

### Republic of North Macedonia

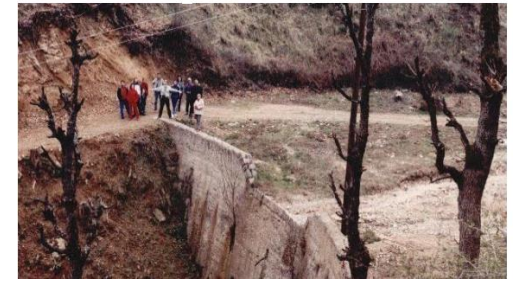
- 1944 Institute of Forestry
- 1947 Faculty of Forestry as a part of Agricultural-Forestry Faculty
- 1949 The Ss. Cyril and Methodius University, Agricultural-Forestry Faculty
- 1975 two independent institutions Faculty of Forestry and Faculty of Agriculture
- 2019 Faculty change the name into:  
Hans Em Faculty of Forest Sciences, Landscape Architecture and Environmental Engineering (HEF)

BSC:

- forestry;
- landscape design;
- eco-engineering and eco-management

MSC:

- forestry,
- landscaping and environment promotion



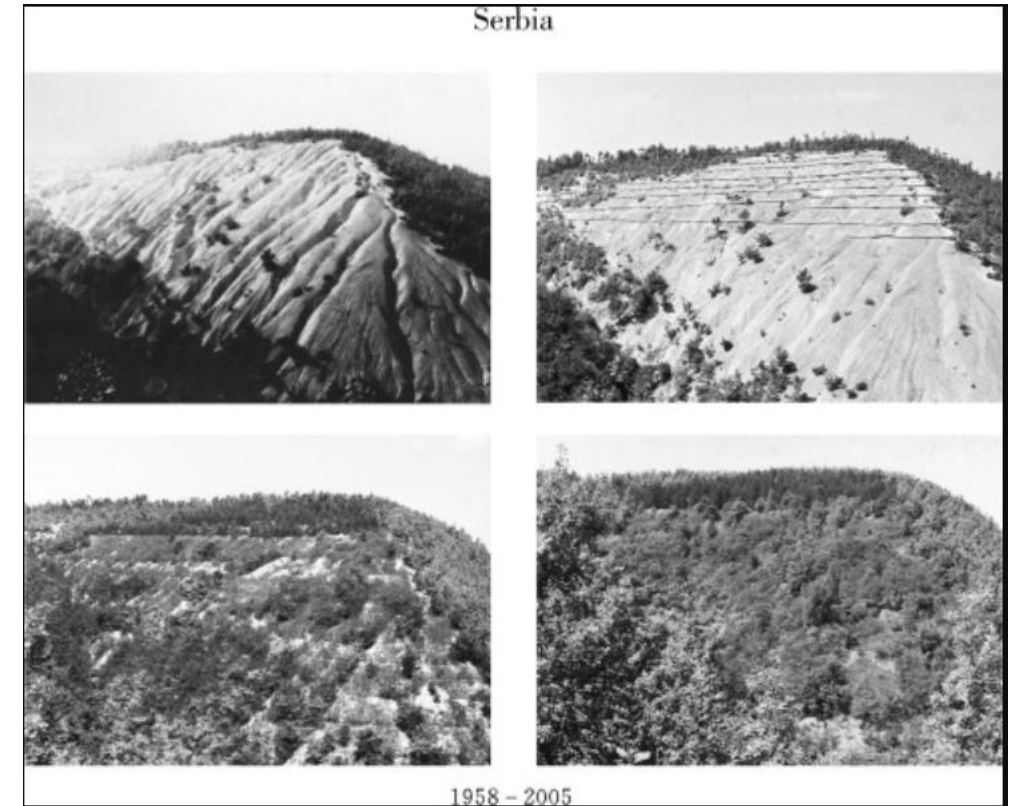
## 2. Education of ETC experts in Serbia

### Republic of Serbia

- 1907 Organised work on ETC
- 1930 Law on torrent control
- Department for torrent control within the Ministry of Forestry and Mining



Check dam Rosic type



Afforestation in Grdelica Gorge (1958-2005)

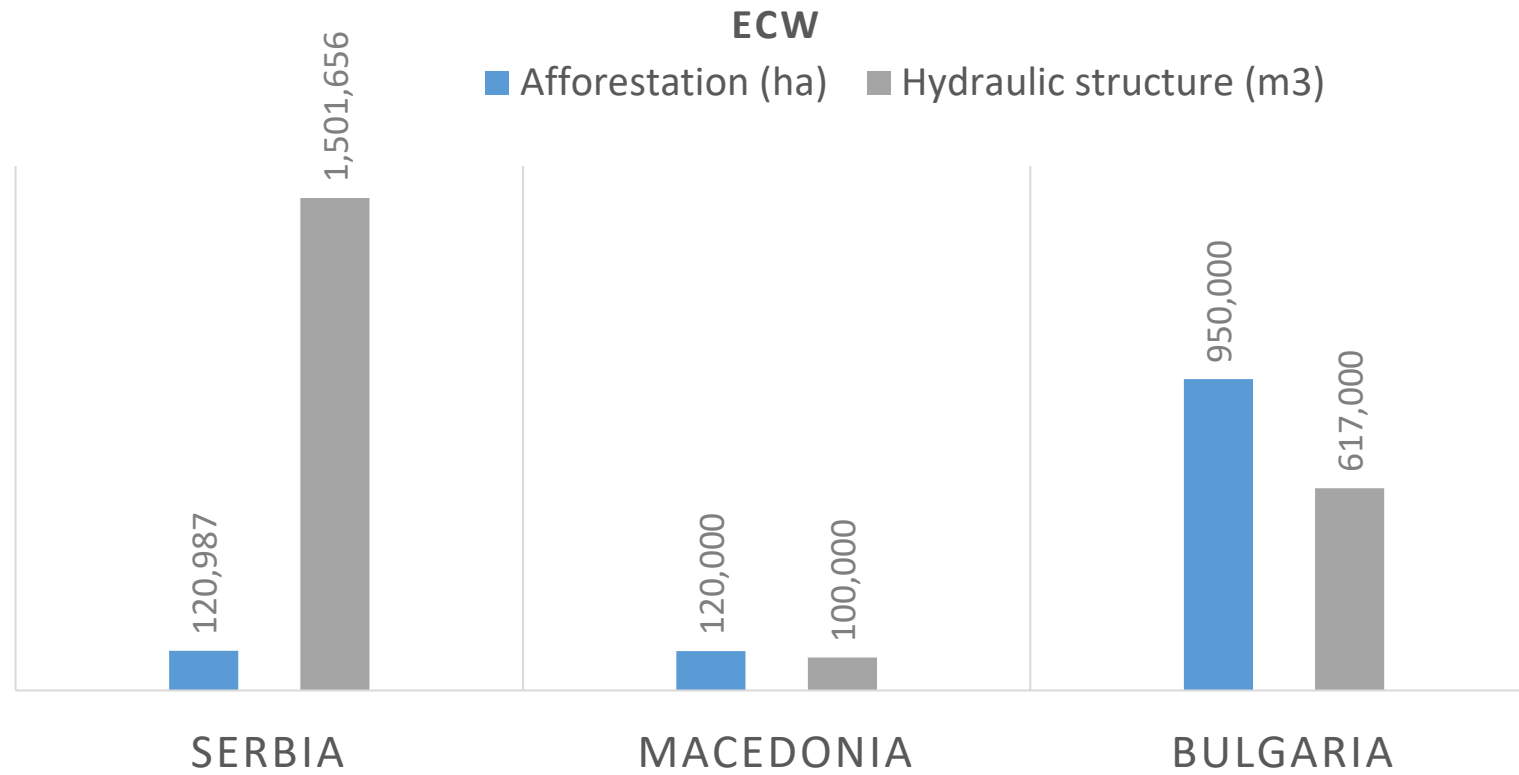
## 2. Education of ETC experts in Serbia

### Republic of Serbia

#### 1) University of Belgrade, Faculty of Forestry

- 1920 University of Belgrade Faculty of Agriculture, Department of Forestry
- Until 1949 subject: Torrent control
- 1949 Faculty of Forestry independent HE institution
- 1966 Faculty of Forestry, Department on Erosion and Soil Reclamation
- 2019 Faculty of Forestry, Department of Ecological Engineering in the Protection of Soil and Water Resources





1945-1990 „Golden period“ of ECW  
(Serbia, N. Macedonia and Bulgaria)

## 2. Education of ETC experts in Serbia

Department of Ecological Engineering in the Protection of Soil and Water Resources



Materials in anti-erosion works

Torrential flows and erosion

Soil conservation

Water protection

Water management in hilly-mountainous areas

Restoration of torrential basins

Water management in hilly-mountainous areas

Design in torrent control

Natural hazards

Organization of anti-erosion works

Spatial arrangement of erodible areas



## 2. Education of ETC experts in Serbia



- **1954 University of Novi Sad**  
**Faculty of Agriculture**
- **Department Water management**  
(floods, river restoration etc)

### **Subject:**

Soil science,  
Engineering hydrology  
River engineering  
Soil conservation structures  
Bioregulation  
Soil and water conservation

- **1965 University of Niš**  
**Faculty of Occupational Safety**
- **Department Environmental protection**  
**Subject: /**

## 2. Education of ETC experts in Bosnia & Herzegovina



- **1948 University of Sarajevo Faculty of Agriculture and Forestry**

**1991 Faculty of Forestry**

**BSC:** Forestry and Horticulture

**Subject:** Torrential floods management

**MSC:** Sustainable forest management and landscape architecture

**Subject:** Meliorations of degraded forests;

Afforestation of extreme forest stands,

Land rehabilitation and erosion control;

Soil protection and

Soil degradation and rehabilitation.

- **1967 University of Banja Luka**

- **1992 University of Banja Luka, Faculty of Forestry**

Department of Silviculture

Elective

Subjects: Land degradation

Forest reclamation

System of anti-erosion afforestation

### 3. Developing a new joint study master program



#### *Master program*

The joint study program of master's academic studies “**Soil Erosion and Torrential Flood Prevention**” was developed within the **Erasmus + K2 project “Soil Erosion and Torrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries (SETOF)”**

The purpose of the joint study program of master's academic studies is to increase the knowledge and skills of **graduate engineers** to effectively solve problems in the field of soil protection from erosion and torrential floods at the regional level

### 3. Developing a new joint study master program



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# 3. Developing a new joint study master program



**Dr. Atila  
BEZDAN**

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**Prof. Dr. Radovan  
SAVIĆ**

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**Radoš  
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POLOVINA**

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**Prof. Dr. Snežana  
ŽIVKOVIĆ**

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### 3. Developing a new joint study master program

Compulsory subjects	Teaching staff	Faculty-University
<b>Land and water degradation</b>	Golubović Tatjana Zlatić Miodrag Kapović Solomun Marijana Lazarević Katarina	FZR – UNI ŠF – UB ŠF – UBL ŠF – UB
<b>Soil erosion protection</b>	Savić Radovan Vulević Tijana Polovina Siniša Lazarević Katarina	PF – UNS ŠF – UB ŠF – UB ŠF – UB
<b>Torrential flood prevention</b>	Ristić Ratko Bajrić Muhamed Vasović Dejan Polovina Siniša Erić Ranka	ŠF – UB ŠF – UNSA FZR – UNI ŠF – UB ŠF- UB
<b>Integrated torrential basin management</b>	Bajrić Muhamed Zlatić Miodrag Erić Ranka	ŠF- UNSA ŠF – UB ŠF – UB



### 3. Developing a new joint study master program

Elective subject I	Elective subject II
Land melioration	Natural disaster risk management
Conservation of karst terrain	Land degradation and ecosystem services
Climate change adaptation	Torrent monitoring and early warning system
Project management in natural resources protection	Decision making in soil erosion and torrent control
Sustainable land management	Modelling of land and water degradation
Biomeliorations of barren lands	Melioration of degraded forests



### 3. Developing a new joint study master program



Teaching staff with 1st generation of students



THANK YOU FOR YOUR ATTENTION

