INSTITUTE FOR NATURE CONSERVATION OF VOJVODINA PROVINCE

Centre for Ecological Research
Hungarian Academy of Sciences

Traditional pig farming in Sava River floodplain forest

AIDA Virtual seminar
March, 2024

Institutional nature protection in Serbia

- Ministry of Environmental Protection
  - Institute for Nature Conservation of Serbia (state) INCS

Regional level: Secretariat for Spatial planning and Environmental Protection in AP Vojvodina

- Institute for Nature Conservation of Vojvodina Province (INCVP)

Responsibilities of INCVP (Law on Nature Protection):

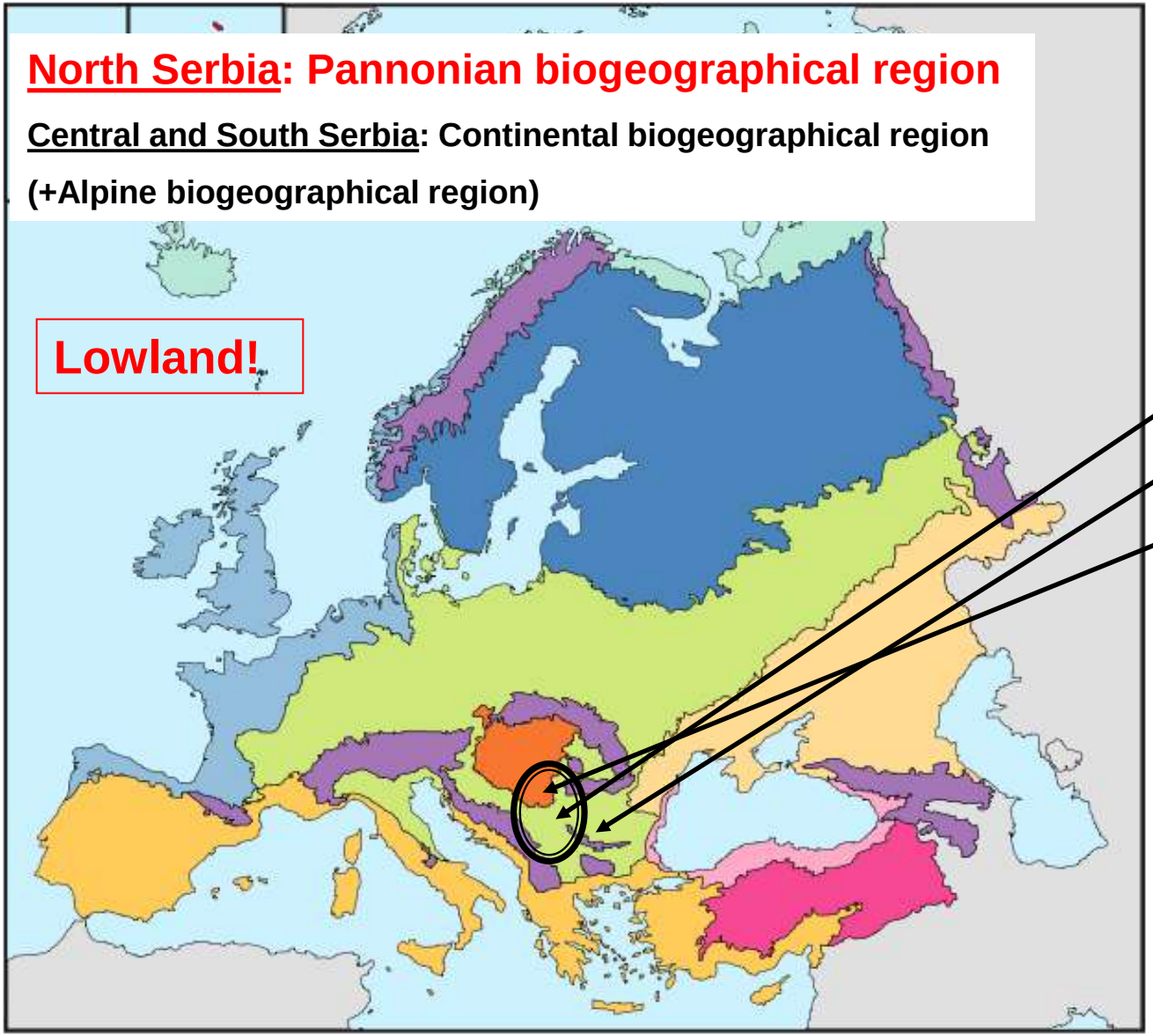
- *Natural values evaluation and PA nomination*
- *INCS and INCVP play ruling function in planning (spatial, FMP, water, game... management planning)*
- *Consulting Protected Area Managers*
- *Educational, promotional ... activities (Eco-edu programmes)*
- *Monitoring of strictly protected species*
- *National&International project partnership (habitat restoration)*
- *Policy development and implementation*

Spatial determination

North Serbia: Pannonian biogeographical region

Central and South Serbia: Continental biogeographical region

(+Alpine biogeographical region)



Project GIZ ESAV

Pigs, Forestry & Floods through the lense of Ecosystem services

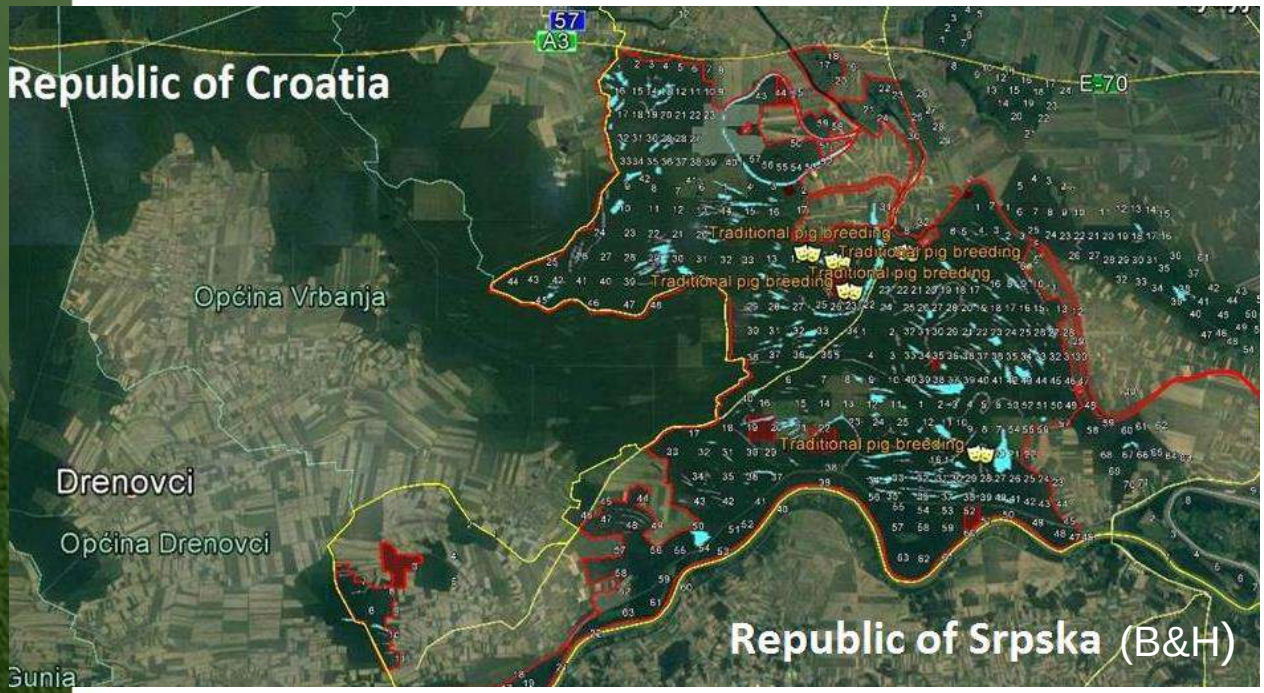
Case study:
Advocating ESAV in Bosut Forest Area

Funded by: Open Regional Fund for South-East Europe - BIODIVERSITY
Ecosystem Services Assessment and Valuation (ESAV) in Future Course of Action in South-East Europe Region

Why Bosut Forest?

1) **Ecological, Ecomical and Social importance:** Largest complex of oak-ash-hornbeam hardwood forests in SE Europe
2) **Extraordinary importance for** biodoversity (IBA, 22 priority NATURA 2000 habitats), forestry and local community.
3) **Deteriorating: conservation status, forest vitality, flood safety!**

   Why? Narrowly-focused management system.
3) **Huge potentials** for value-added from integrated management



Ecosystem services / Nature's contributions to people

UN MEA (2005) Ecosystem services: Conditions and processes through which natural ecosystems and the species that make them up, sustain and fulfill human life (Daily, 1997).

IPBES: Nature's contributions to people (all the positive contributions, or benefits, and occasionally negative contributions, losses or detriments, that people obtain from nature.)

Strongly depends on ecosystem functionality

Ecological integrity of water course and alluvium

Land use history and consequnces

Crossroads of several empires

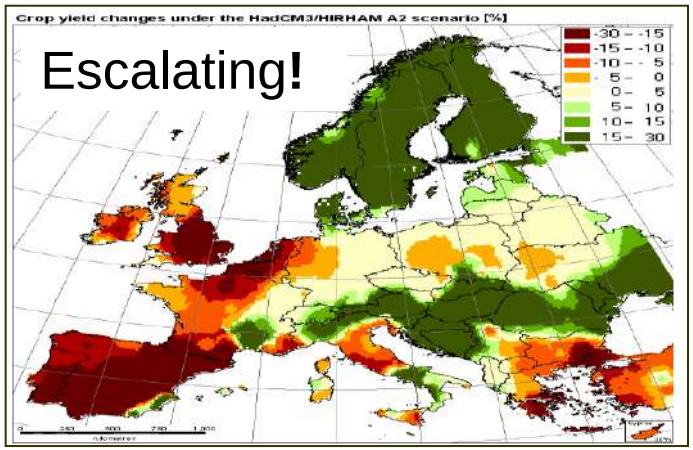
Empires: Roman, Turkish, Habsburg.

Up to XX century, the area had integrated - traditional system of floodplain management (Flood, Forestry and Farming)

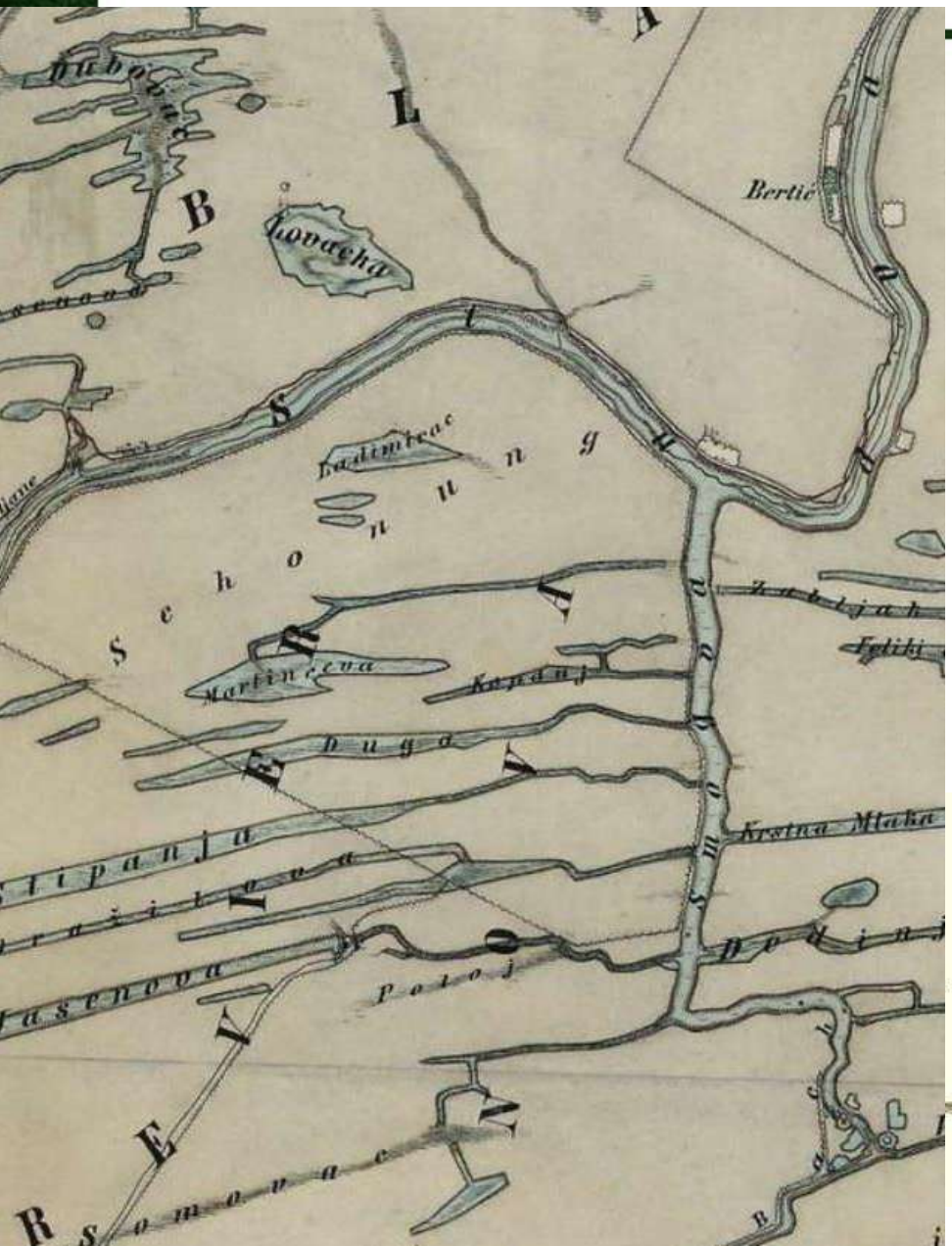
Later: About 90% of the former floodplain area (mostly forests) disconnected from river in 1938.

2012-2013 drougth

2014 Floods



Traditional flood-regulation



The oxbows were connected to the rivers by canals.

Fish returning into river after spawn were catched in theese canals.

Many canals are named by families who **maintained it**.

Network of canals and wetlands:

- Enlarged the spawning area for fish (also for frogs, newts etc.)
- Equalized flooding
- Enhanced draining after floods increasing the period suitable for grazing
- Increased biomass production

Traditional farming & forestry

XVIII c – the income from pannage fees was twice the income from timber!

XIX c - oak barrels

In 1862 :

- 97 939 grazing animals (cattle and sheep) and ”at least the same number of pigs” kept in the forest.

Coevolution?

XX c. (until 1978): up to 50.000 pigs + some cattle

From 1990’s – no cattle in forest.

In 2010: 2000 pigs.

In 2016: 1000 pigs.

2020 onwards: no cattle, no pigs.

(Regulation on African swine fever)

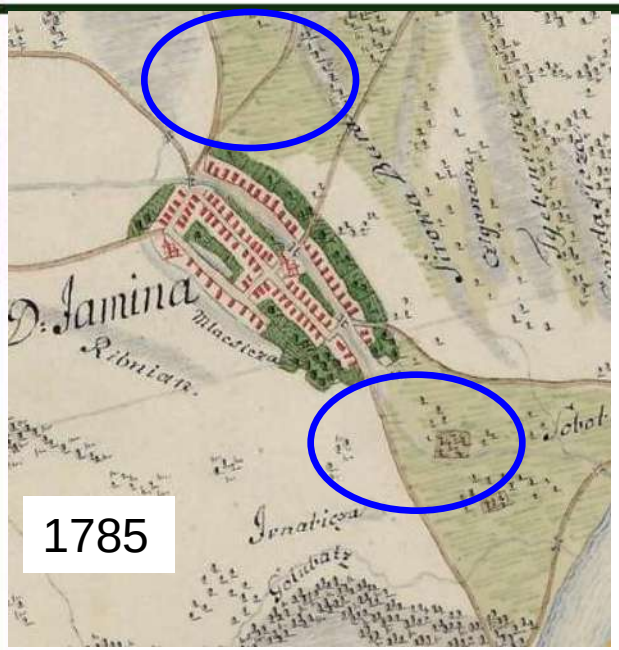
Livestock-farming and biodiversity

Large herbivors are key species of ecosystem: they regulate the vegetation

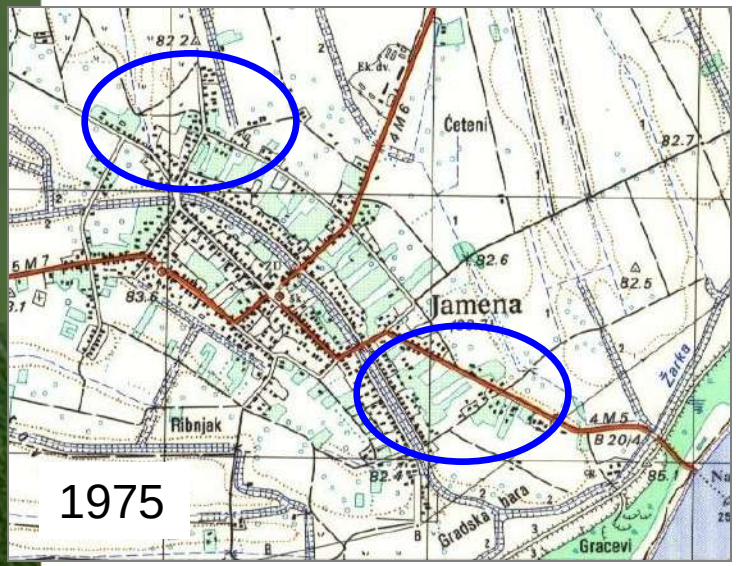
- by grazing and trampling,
- providing micro-habitats,
- and food resources for other animals.

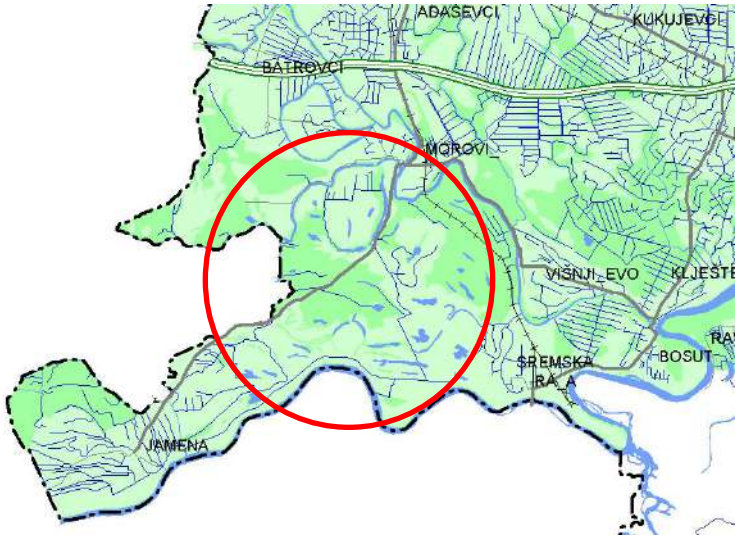
- Wild animals have been exterminated and replaced by domestic animals,
- our habitats have been maintained by traditional, extensive grazing since the bronze age.

Land use changes in XX c



- Dyke along Sava River,
- Sluicegate on Bosut River,
- Expansion of settlements to former wetlands,
- Hunting resort 1978-’92 (conflict with extensive livestock farming)





Results of anthropogenic influence

- About 90 % of the former floodplain area (forests and pastures) have been disconnected by dams and dykes
- Network of drainage ditches in surround. arable lands and passing through the forest complex

Consequently:

- Water regime and dynamics changed
- Capacities for flood protection insuficient
- Forest vitality and production deteriorated
- Conservation status of species deteriorated
- Integrated management practice almost faded out.

Policy question

How can Nature conservation and integrated resource management contribute to sustainable development?

Selection of ES

- To addres the key stakeholders (managing the area, ecological processes and functionality).

- Water management
- Forestry
- Nature conservation
- Farming

ES valuation

Ecological, economical and social importance of the area!

Comparative analyze of ES for two scenarios with policy recommendations:

A) Busines as usual (losses: forestry, flood, habitats)

B) "New" concept (flood retention, farming, integ. management)

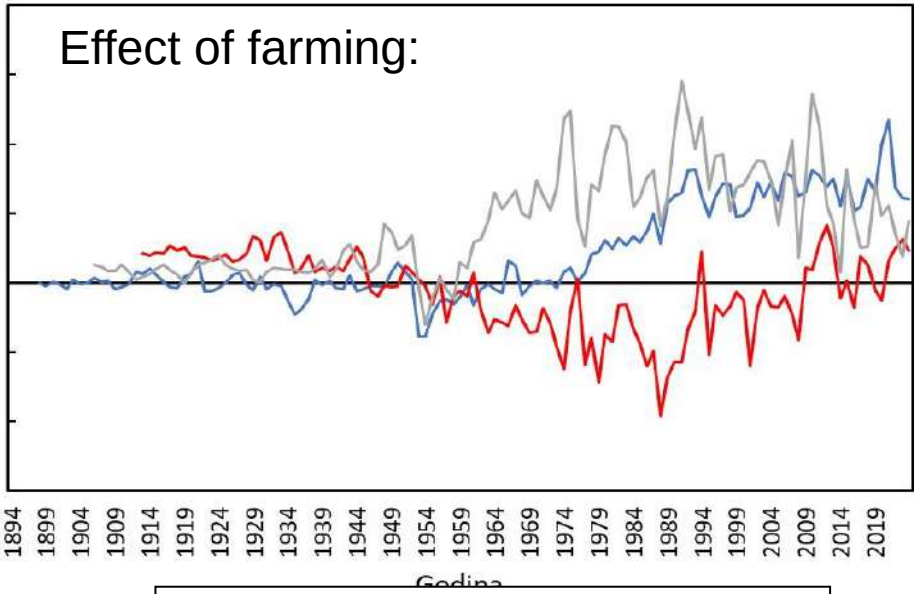
Selected ES:

- **Water** flood detention (avoided cost, replacement cost)
- **Timber** (market value)
- **Habitat function** (conservation status, habitat coverage)
- **Traditional farming** (Market value of meat produced in traditional farming; cost of alternative habitat maintenace)

Results: Timber production

What would be benefit of optimized water suply?

- In sanitation cuttings forestry lose up to 95 % of timber value.
- Savings in optimized water supply: 30 – 50% (H20= key factor)



1 m3 of **healthy** oak **timber** - 300 € to 1.000 €,
Dead-wood from **sanitation** - less then 100 €

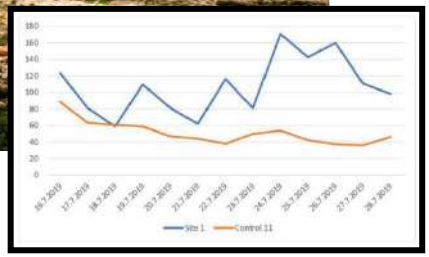
Tree corring analyses:
The ”farmed” oaks grow faster!
(Land use study - Sava TIES DTP)

Traditional extensive farming (meat/habitat)

Meat production: 10.000 X 100 €/pig = **1.000.000 €/year**

+ entrance fees **20.000 - 40.000 €**

Bat detector



Habitat maintenance:

- Mulching marshes (shrubs) = 1500 €/ha
- Mowing (marsh/swamp) = 50-100 €/ha
- Average savings: **50.000-70.000 €/year**

Rare habitats & species depends on traditional farming!

Results: Reconnection of floodpain

avoided cost

Temporal Water Retention in the forest might store the flood wave of **200 mill m3** (forest tollerance)

Costs (Source: Watermanagement authorities, SRB)	Value (RSD/Eur)
The implementation of the flood defense is on line I line of defense	300.000.000
Rehabilitation after the flood defense in 2014.	131.000.000
Total costs (Flood defence 2014)	**431.000.000 rsd / 3,65 mil €** **(**only excess water management costs in the 2014 flood**)**

Results: Habitats and species

	Scenario A	Advantage of Scenario B	Advantage with regard to:
habitat 3130	C < 30 ha	B 65-200 ha	- conservation status - habitat area
habitat 3150	C < 10 ha	B 200-600 ha	- conservation status - habitat area
habitat 3260	C < 2 m^2	A 6-30 ha	- conservation status - habitat area
habitat *91E0	C	B	- conservation status
habitat 91F0	C	A	- conservation status
habitat 9160	B	A	- conservation status
three-stamen waterwort (Elatine triandra)	C	B	- conservation status
(Lindernia palustris)	C	B	- conservation status
four-leaf clover (Marsilea quadrifolia)	C	B	- conservation status
water violet (Hottonia palustris)	C	B	- conservation status
water soldiers (Stratiotes aloides)	C	B	- conservation status
Debreceni horseradish (Armoracia macrocarpa)	C	B	- conservation status
summer snowflake (Leucoium aestivum)	B	A	- conservation status
narrow-leafed ash (Fraxinus angustifolia)	C	B	- conservation status
common oak (Quercus robur)	C	A	- conservation status

Results: Habitats and species

	Scenario A	Advantage of Scenario B	Advantage with regard to:
Plankton		100%	- increase of area/volume
great capricorn beetle (Cerambyx cerdo)	B	A	- conservation status
large copper (Lycaena dispar)	B	B	- conservation status
carp (Cyprinus carpio)	C	A	- conservation status
European bitterling (Rhodeus amarus)	C	A	- conservation status
Danube crested newt (Triturus dobrogicus)	C	B	- conservation status
European fire-bellied toad (Bombina bombina)	C	B	- conservation status
European pond turtle (Emys orbicularis):	C	B	- conservation status
white-tailed eagle (Haliaeetus albicilla)	6 - 7	10 – 15	- increase in nesting couples
black stork (Ciconia nigra)	6 - 8	20 – 25	- increase in nesting couples
collard flycatcher (Ficedula albicollis)	700 – 1.100	2.000 – 28.000	- increase in nesting couples
Eurasian otter (Lutra lutra)	B	B	- conservation status

Hypothesis confirmed: Improved habitat management for umbrella species is compatible with higher provision of the services important to forestry, water management and local community.

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Traditional ecological knowledge for better conservation: the case of the 'Gourmet omnivorous' pigs

Molnár Zsolt; *Demeter László; Szabados Klára; Kiš, Alen; Ajvazović, Milutin; Runjanin, Borislav; Mandušić, Vlada; Biró Marianna; Öllerer Kinga; Marinkov, Jelena; Ulicsni Viktor; Babai Dániel; Katona Krisztián*

Reviewing living TEK of *svinjars*

Milutin Ajvazović

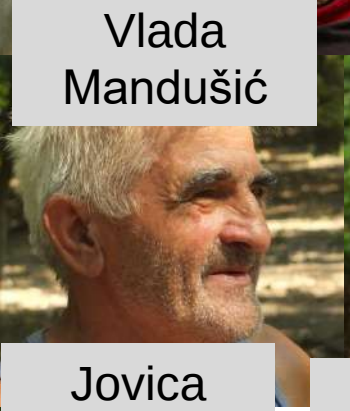
Knowledgeable svinjars have

- decades long personal experience
- knowledge from parents, elders
- shared and discussed knowledge
- tested knowledge
- good memory

Diverse methods

- Picture-based interviews
- Semi-structured interviews
- Landscape walks with svinjars
- Participatory field work
- 21 days of visial observation
- Interviews about observations

Vlada Mandušić



Jovica Stojaković

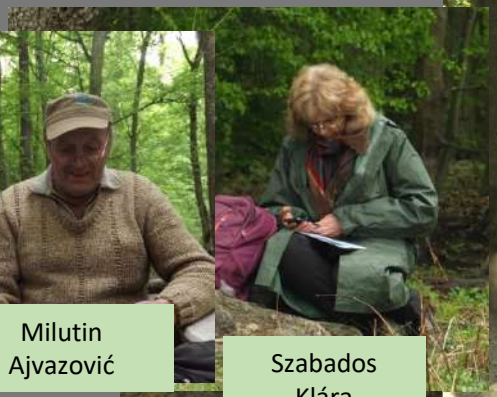
Lazar Milanović Brata

Bora Runjanin

Molnár Zs., Babai D. (2021): Inviting ecologists to delve deeper into traditional knowledge. *Trends in Ecology and Evolution*, 36.

The research group

Molnár Zsolt



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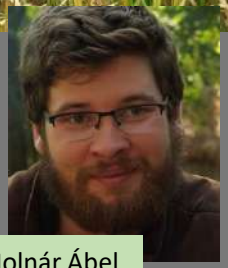
Kemenes Anna



Molnár Ábel

Jelena Marinkov

Varga Anna

Máté Gábor

Öllerer Kinga

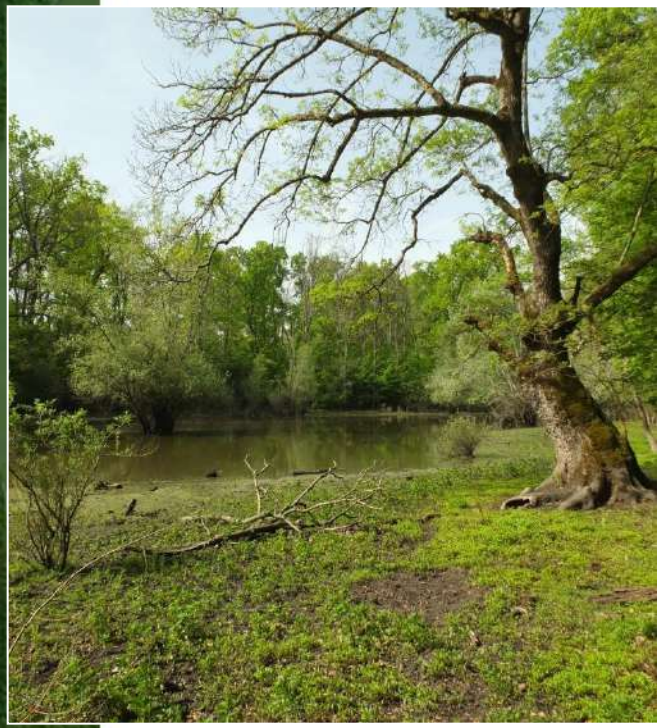
Katona Krisztián

Juhász Erika

Where? What pigs?

Quercus-Carpinus-Fraxinus **forests** on the Sava-Bosut floodplain (with embedded small **marshes**

Pigs
Free ranging, kept in the forest all year round
Not ancient breeds (Yorkshire, Duroc, Piétrain, hybrids)
Social learning by sows about forest forages (knowledge of pigs!)



Life of pigs and *svinjars*

Traditional svinjar’s housing

Wooden sheds for difefrent purposes

Shed for sows and piglets (from twigs, hay and nylon)

Masting on acorns

fallen unripe (too early)

wormy

germinating, 'sweet'

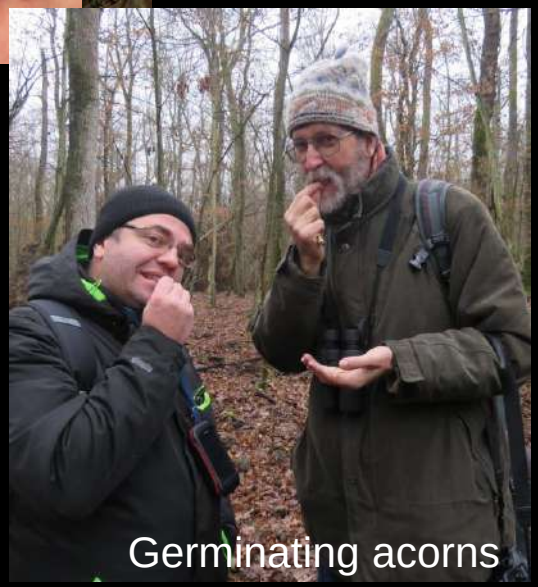
soaked for months

spicy

Svinjars' knowledge

„Till the day of Peter and Paul (12th July) acorns only grow on Saturdays, later every day."

„ Saint Elijah (hot days in July) kills acorns."



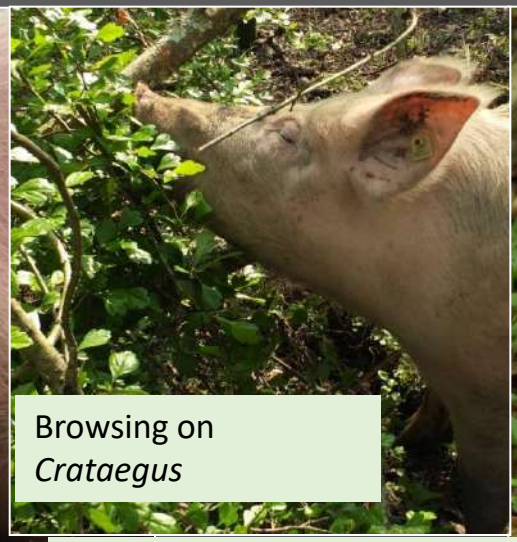
Germinating acorns were less bitter.

Pigs are foraging between forest and marshes

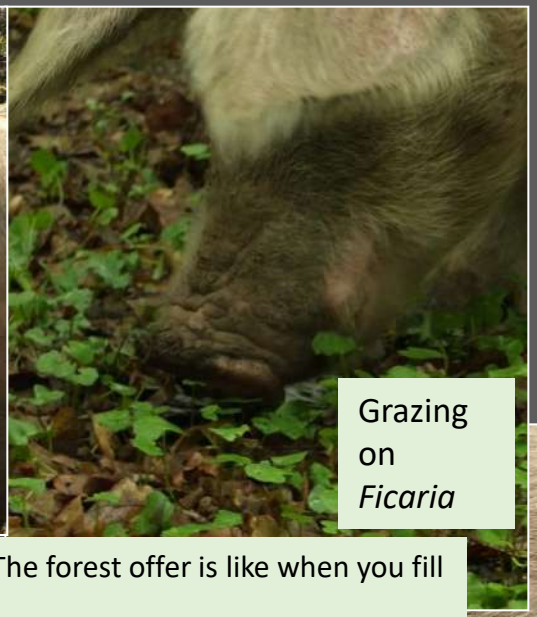
Behavioral reasearch

Carex roots: chewed for „vitamins”

Tree/bush roots are not eaten, only tore



Browsing on *Crataegus*



Grazing on *Ficaria*

„In summer the forest is hungry. The forest offer is like when you fill yourself with water melon.”

’Wild’ apple and pear

Grazing on marsh grasses (*Agrostis stolonifera, Glyceria fluitans*)

Earthworms

Frogs (*Pelophylax* spp.)

Tipula spp. larvae

Emys orbicularis

Fox carrion
(not eaten)
(*Vulpes vulpes*)

Helix pomatia

”Pigs eat everything called: fish.”

Unionidae

diving for it

Carassius gibelio

Ameiurus nebulosus, A. melas


Educators are here!
Keeping an eye on newcomers!


earthworming
foraging while walking (rooting, Ficaria)
salaš
grazing, resting
foraging while walking back
grazing

Gourmet + Pig

kobasice

kulen

slanine

at the ’salaš’ place

omnivorous but with fine-tuned foraging preferences

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https://ecolres.hu/disznok-pigs-svinje/

https://balkangreenenergynews.com/wp-content/uploads/2018/06/ESAV-case-study-Bosut-Forests-2018.pdf