

SWAN project stakeholders workshop  
Bridges and Barriers to Public Participation

Sofia, April 20, 2015

## ASCOR

Arsenic Contamination of Ogosta River: Linking biogeochemical  
processes in floodplain  
soils with river system dynamics

## BENEFITS FOR LOCAL COMMUNITIES

Tsvetan Kotsev

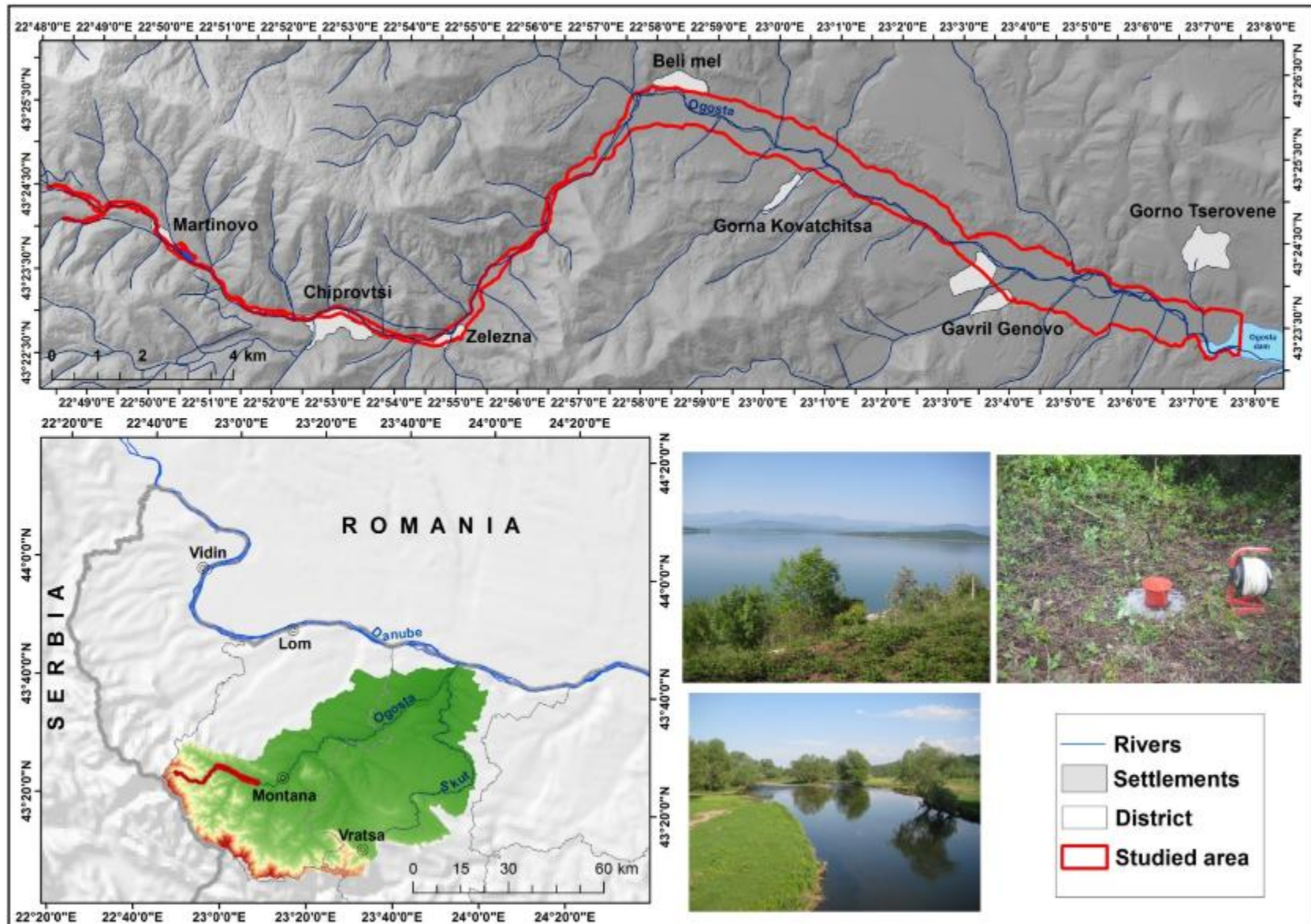
National Institute of Geophysics, Geodesy and Geography

NIGGG-BAS

IBPD-ETH Zurich



# Ogosta River, NW Bulgaria



# Ogosta River, NW Bulgaria

- Mining of Fe, Pb/Ag, and Au from 1951-1999
- Tailings pond dam failure in 1964 (~100'000 m<sup>3</sup>)
- Direct discharge of waste slurries from 1964-1979
- Numerous waste rock dumps and ~3.5 mln t of ore waste stored in three tailings impoundments
- Impoundments were "remediated", but floodplains remain heavily contaminated (140 km from Chiprovtsi to Danube)



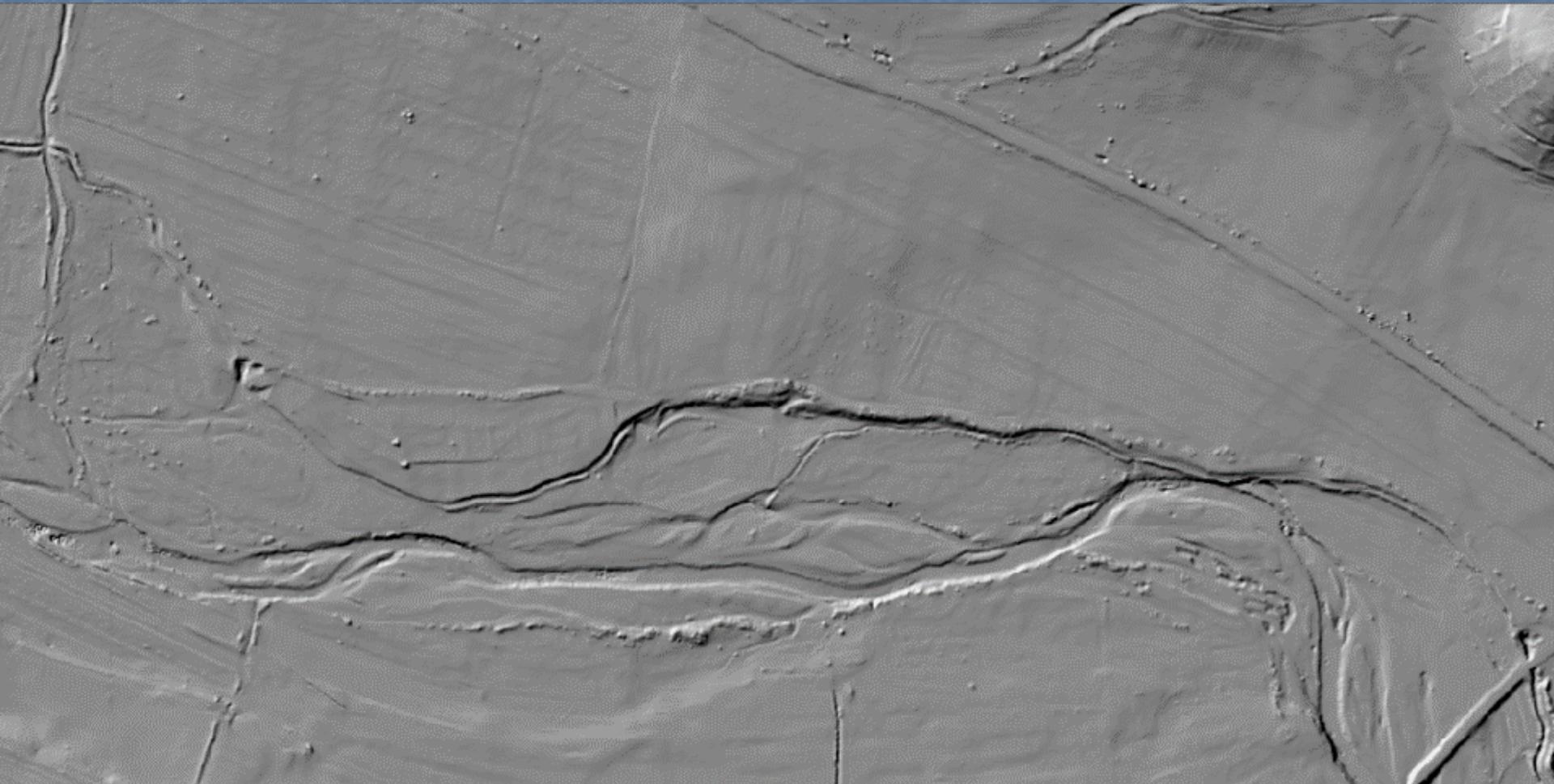
# ASCOR itself

- ASCOR goals
  - Spatial distribution of As contamination in floodplain soils
  - Arsenic release from soils to river and groundwater
  - Integration of molecular and river-system scale information on As fate in the Ogosta Valley

# Expected ASCOR products/output

- Detailed DEM and orthophoto mosaics of the Ogosta Valley

# Expected ASCOR products/output



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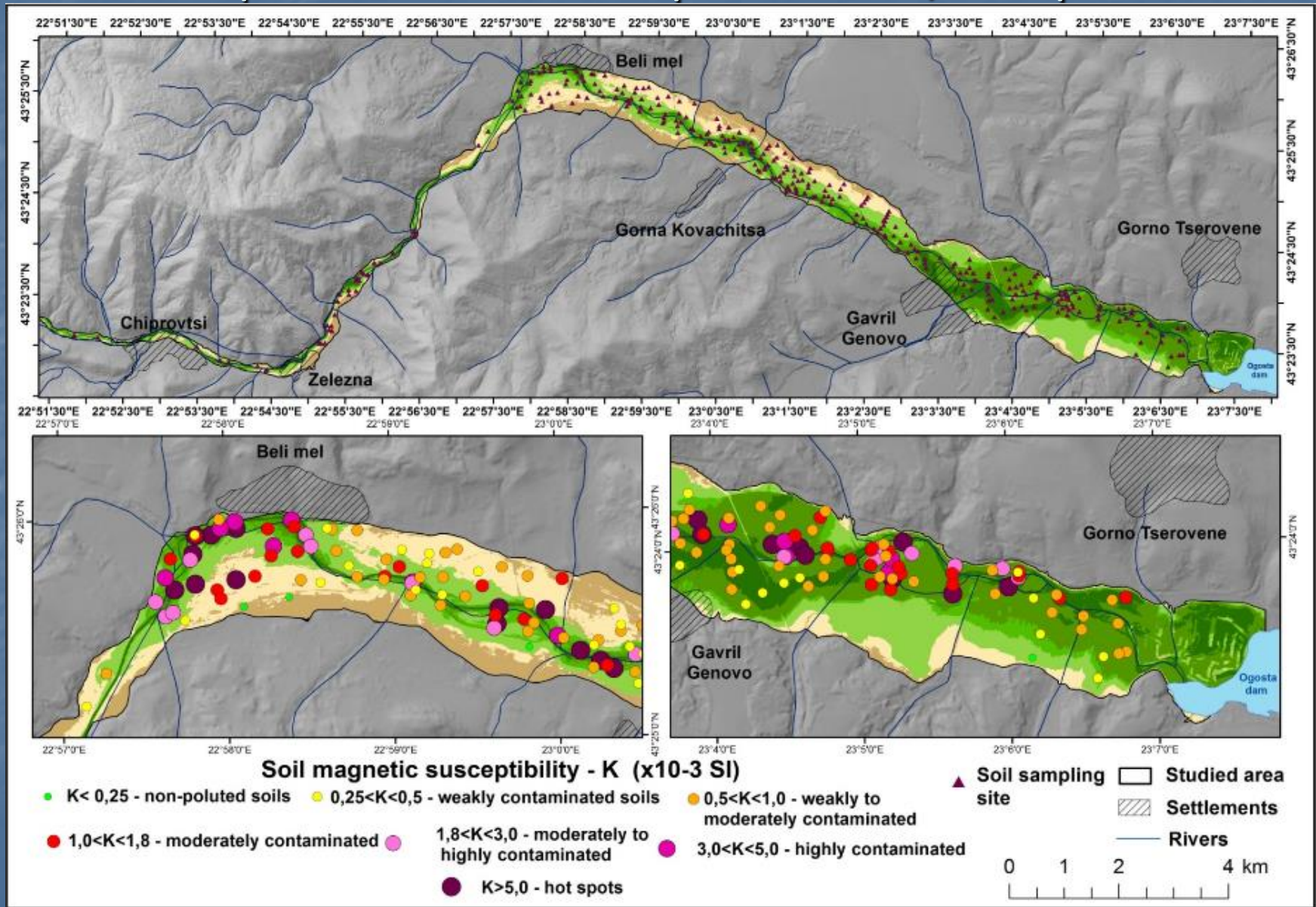


# Expected ASCOR products/output

- Detailed DEM and orthophoto mosaics of the Ogosta Valley
- detailed map of As soil contamination



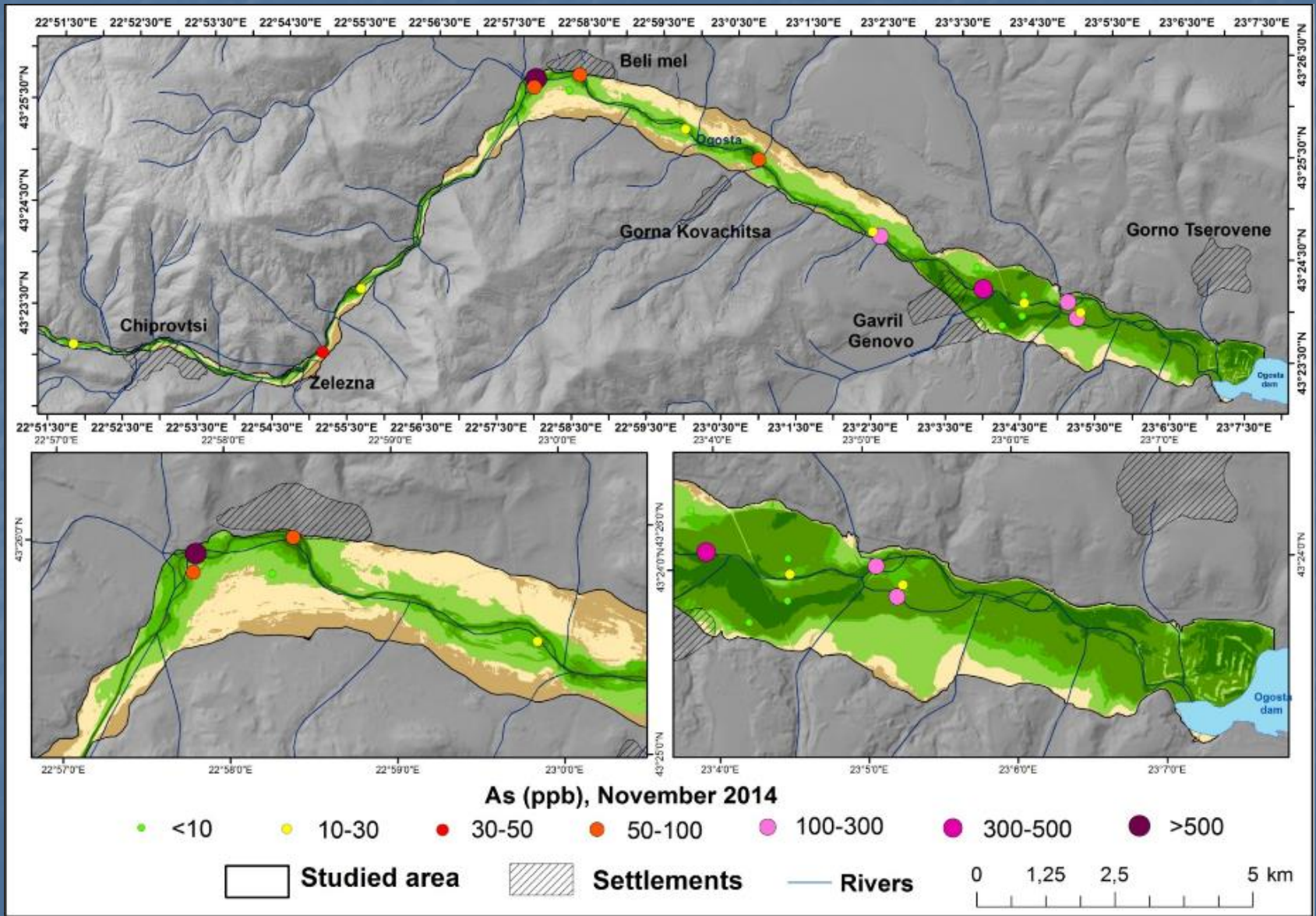
# Expected ASCOR products/output



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- Detailed DEM and orthophoto mosaics of the Ogosta Valley
- detailed map of As soil contamination
- hot spots of groundwater pollution outlined

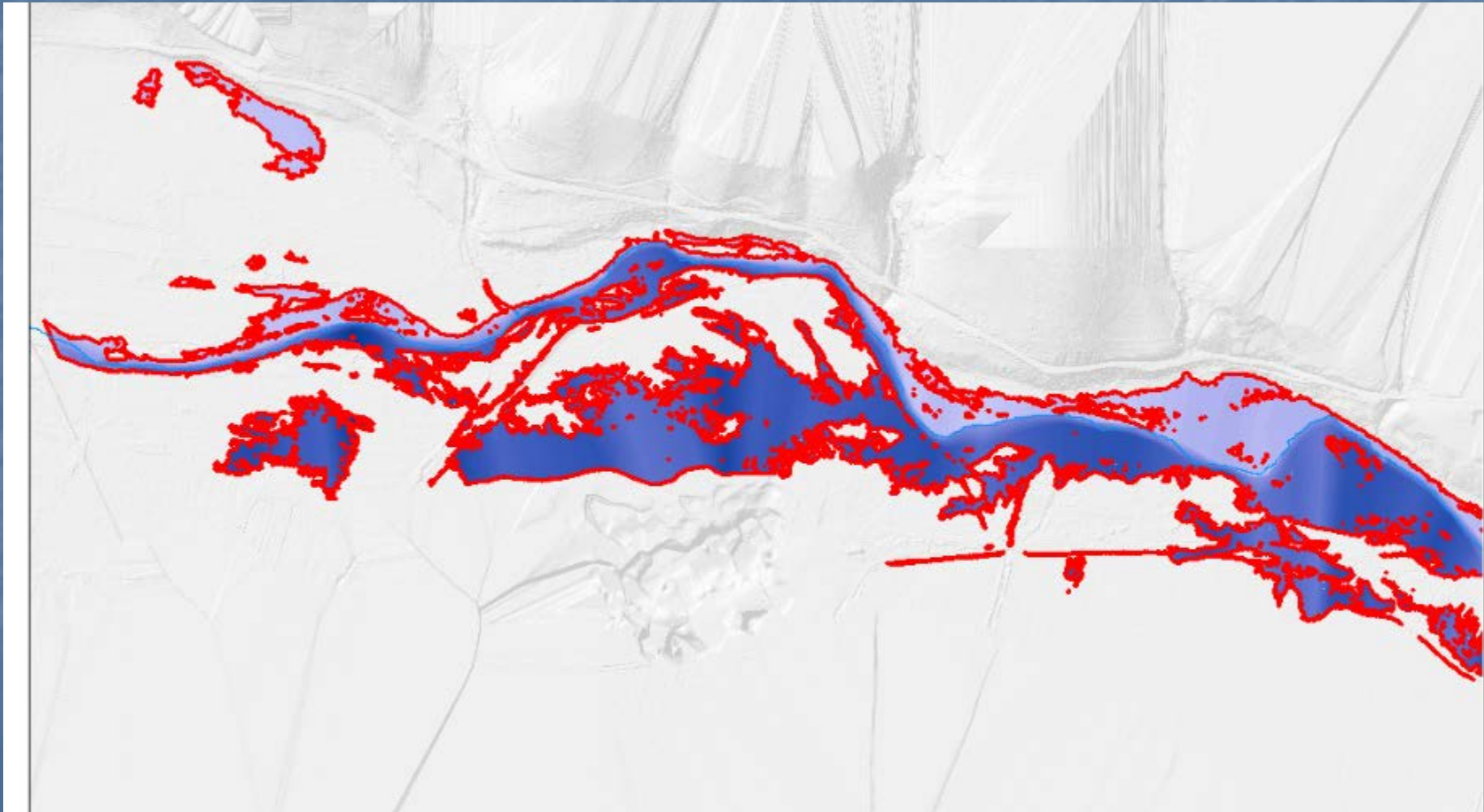
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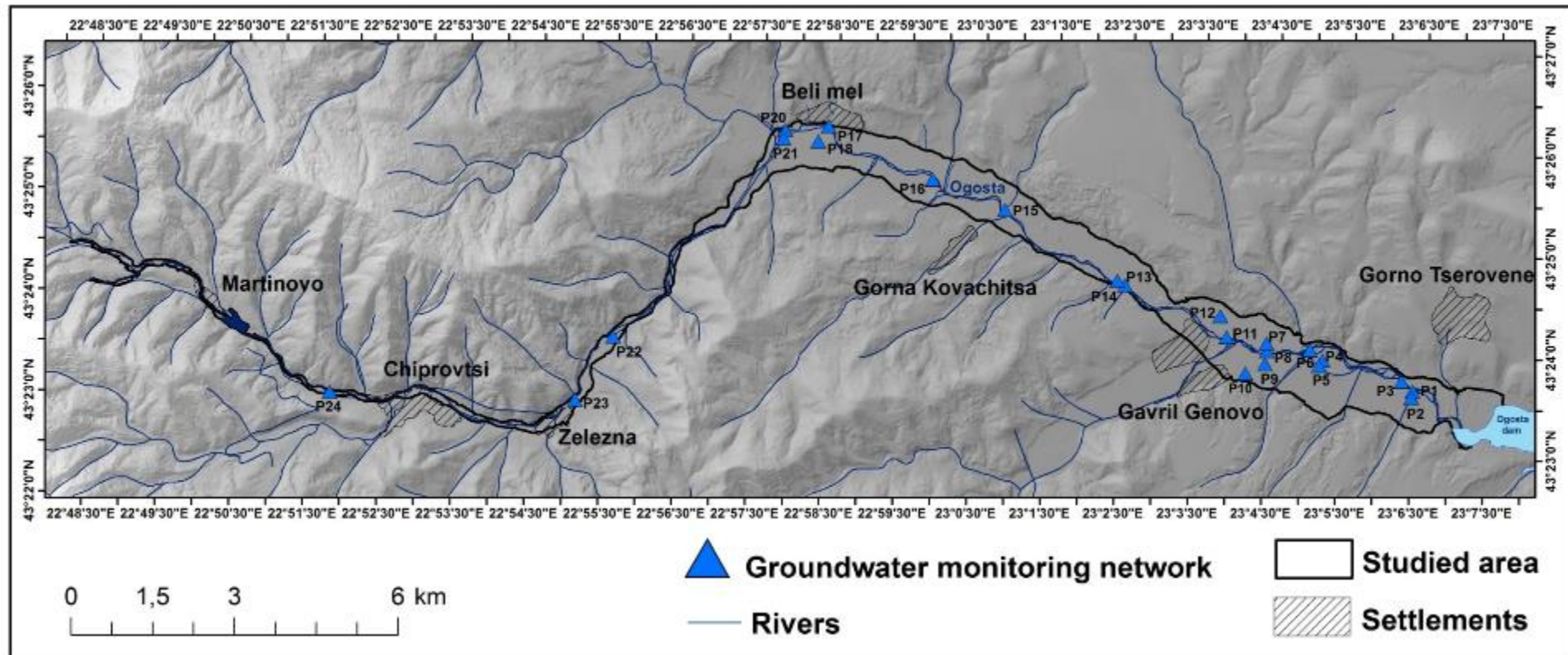
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- Detailed DEM and orthophoto mosaics of the Ogosta Valley
- detailed map of As soil contamination
- hot spots of groundwater pollution outlined
- flooding maps
- river and groundwater monitoring system

# Expected ASCOR products/output

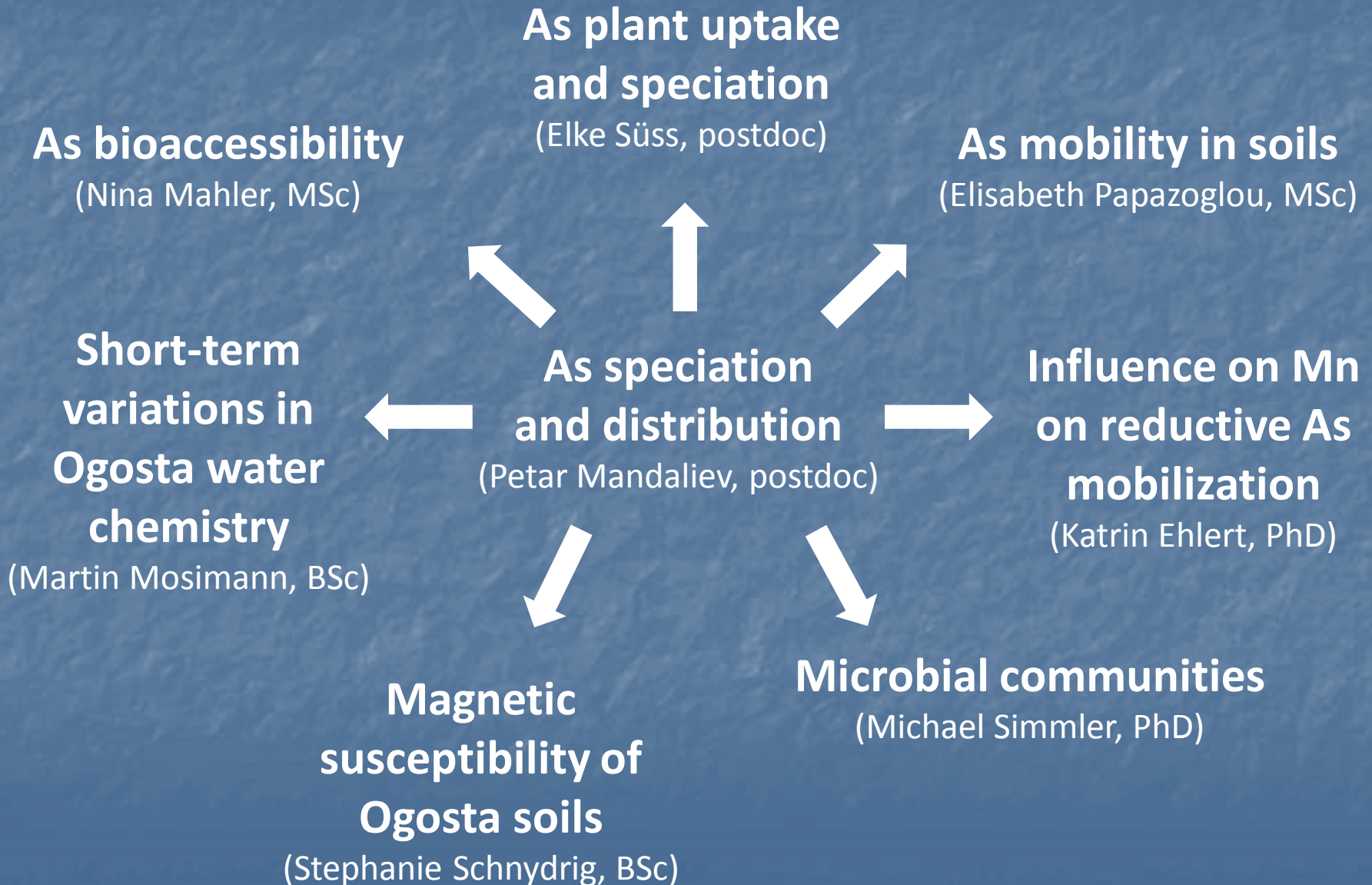


# Expected ASCOR products/output

- Detailed DEM and orthophoto mosaics of the Ogosta Valley
- detailed map of As soil contamination
- hot spots of groundwater pollution outlined
- flooding maps
- river and groundwater monitoring system
- better knowledge on As release factors



# Expected ASCOR products/output



# Identification of stakeholders and their water related needs

- Local authorities: Municipalities of Chiprovtsi, Georgi Damyanovo and Montana
  - Tourism development and environmental protection
  - Water supply, sewerage system, waste water treatment
  - Making and maintenance of cadastres



# Local business

- Tourist operators
  - Interested in clean environment and river water

**Guest house Torlatsite, Chiprovtsi**



**Ogosta River**



# Local business

- Sheep and cattle breeding farms in Chiprovtsi, G.Tserovene v., etc.
  - clean water
  - clean floodplain



# Local business

- Farmers in the Ogosta Valley
  - clean floodplain
  - protection against floods



# Local business



- ECOTERRA – biofarming in the Ogosta valley
  - clean groundwater for irrigation
  - groundwater drainage
  - protection against floods



# Local business

- Small water power plants
  - river discharge



# Local NGOs

- Local action group – Zapadna Stara planina – Kopren – Midzhur
  - Development of local economy
  - Environmental protection
  - Rising the awareness of the environmental problems





# Local people

- Interested in:



# Local people

- Interested in:
  - Better quality of drinking water



# Local people

- Interested in:



# Local people

- Interested in:
  - Better quality of drinking water
  - Irrigation of the vegetable gardens
  - Protection against floods and river bank erosion

# Local people

- Interested in:



# Local people

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# Local people

- Interested in:
  - Better quality of drinking water
  - Irrigation of the vegetable gardens
  - Protection against floods and river bank erosion
  - Fishing
  - Swimming in the river

# Local people

- Interested in:





# Local people

- Interested in:
  - Better quality of drinking water
  - Irrigation of the vegetable gardens
  - Protection against floods and river bank erosion
  - Fishing
  - Swimming in the river
  - Preservation of the riverine environment

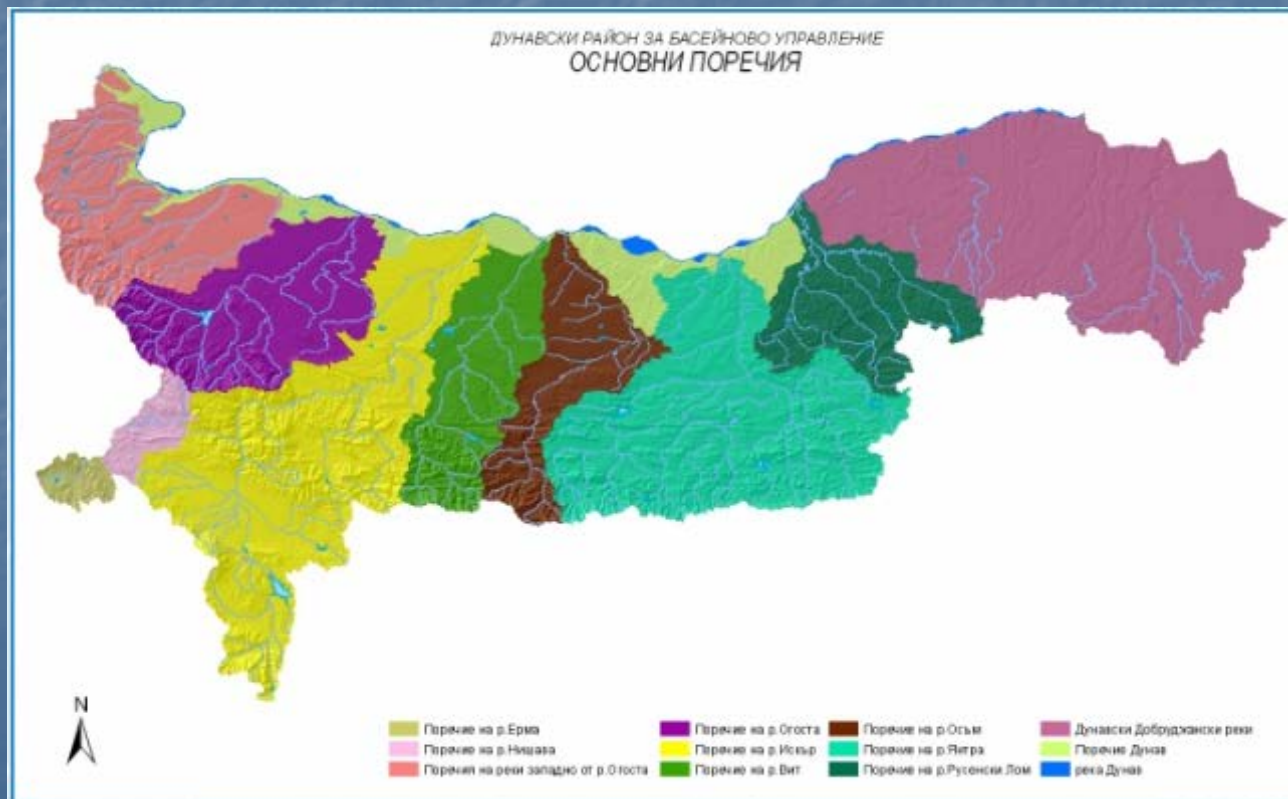
# Local people

- Interested in:



# Institutions

- River Basin Directorate – Danube district
  - Information on river and groundwater quality
  - Information on point and diffuse sources of pollution



# Institutions

- National Institute of Hydrology and Meteorology
  - Revealing river - groundwater interaction
  - Automation of river monitoring



# Interaction with stakeholders

- Chiprovtsi town hall meeting, April 9, 2013 - Presentation of ASCOR project to the local authorities, governmental agencies and NGOs
- Field demonstration for pupils from Chiprovtsi, May, 2013



# Interaction with stakeholders

- Provision of plots for construction of monitoring wells by the local authorities
- Involvement of local people and business in the project activities



# ASCOR output versus stakeholders' needs

ASCOR output	Local authorities	Local tourist operators	Local farmers	WPP operators	Local NGOs	Local people	NIMH	RBD
General geographical data (GIS)	+							
Map of As soil contamination	+		+		+	+		+
Map of GW pollution hot spots	+		+		+	+	?	+
Flooding maps	+		+			?		+
Data from river and GW monitoring system	+		+		+	+	+	+
Knowledge on As release			?					?



# SCOR for the local community

- Raised awareness of the local environmental problems at local and national level
- More adequate decision-making on water management and land use
- Better prospects for dealing with the As contamination in the Ogosta Valley





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Flooding maps	+		+			?		+
Data from river and GW monitoring system	+		+		+	+	+	+
Knowledge on As release			?					?

**Can be ASCOR harmful  
for the local tourism  
development?**



# Thanks for your attention





**June  
2013**



**May  
2014**

# Interaction with stakeholders

- Presentation of the ASCOR project
- Field trip with pupils from Chiprovtsi
- Contract for cooperation with the municipality of Chiprovtsi
- Provision of plots for construction of monitoring wells by the local authorities
- Sent information on monitoring wells to the River Basin Directorate
- Involvement of local people and business in the project activities
- Contacts with the manager of a small WPP
- Talks with local people in the field explaining the risks of arsenic pollution
- Contacts with the local hydrologist of NIMH, a map of the GW monitoring system sent to NIMH