

## **The Vjosa river system in Albania: a summary of actual challenges and agendas**

Aleko MIHO, Sajmir BEQIRAJ, Wolfram GRAF & Fritz SCHIEMER

The paper provides a short summary of a volume on the natural value of the Vjosa river in Southern Albania. Despite its unique physical and biological environmental features, the riverine landscape is in danger to be critically deteriorated by a series of hydropower dams. The hazards are indicated and the expected violations of international rules and conventions are defined. We suggest a strengthening of the local scientific basis for river management in cooperation with international experts and the establishment of a platform across the science-policy interface – were science can ‘speak to’ policymakers, authorities and local people – with a clear participation and decision structure.

**MIHO A., BEQIRAJ S., GRAF W. & SCHIEMER F., 2018: Das Vjosa Fluss System in Albanien: eine Zusammenfassung der wichtigsten Herausforderungen und Aufgaben.**

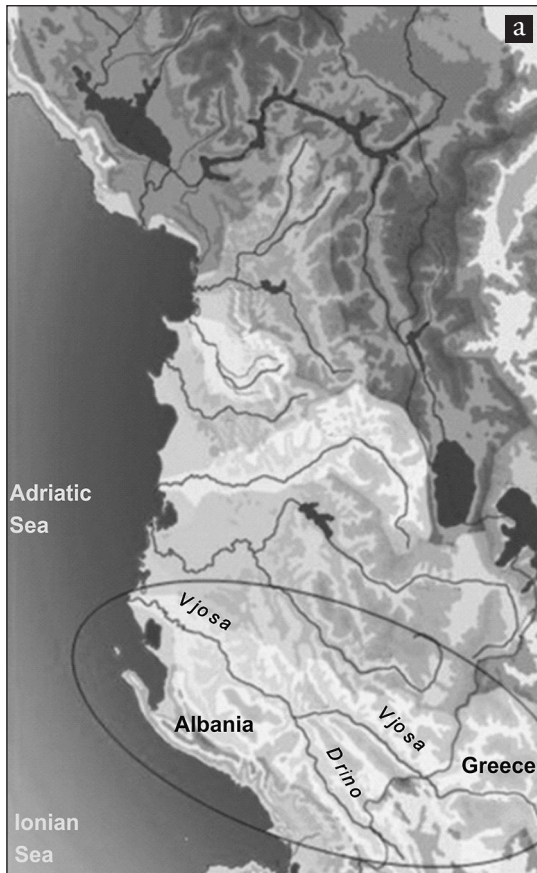
Der Artikel gibt eine Zusammenfassung über den Schutzwert des Vjosa Flusses in Südalbanien. Trotz der einmaligen physikalischen und ökologischen Situation des Gebietes besteht unmittelbare Gefahr, dass die Flusslandschaft durch Staudammbauten zerstört wird. Der Artikel weist auf die verschiedenen Gefährdungen hin, sowie auf die internationalen Gesetze und Konventionen, die gegen eine Staudammerrichtung sprechen. Es wird nachdrücklich empfohlen, die lokale Fachexpertise für die Beurteilung von wasserwirtschaftlichen Maßnahmen in Kooperation mit internationalen Fachexperten zu stärken und die Wissenschaft stärker in die Entscheidungsprozesse einzubinden. Um eine dauerhafte Gesprächsbasis zwischen Wissenschaft, Politik und Vertretern der lokalen Bevölkerung zu gewährleisten sollten Flussforen mit einer klaren Teilnahme – und Entscheidungsstruktur eingerichtet werden.

**Keywords:** hydropower dams, natural heritage, Bern Convention, science- policy interface, international cooperation.

### **The Vjosa – a unique river – is threatened**

Vjosa River is the one of the last free flowing, wild rivers in Europe (SCHIEMER et al. 2018 this volume). Together with its tributaries, the Vjosa provides a dynamic, near-natural ecosystem, comprising crystal clear streams, deep gorges, and extensive alluvial zones and floodplains (Fig. 1 u. 2). This riverine landscape is a hotspot for European biodiversity, hosting many threatened as well as endemic species. The studies summarized within this volume, represent the result of a very short research visit. They provide a first snapshot into a complex and diverse environment with high natural values, including taxa new to science and many species which were formerly abundant in Europe and are nowadays rare and endangered. The specific biodiversity is dependent on the high fluvial dynamics in the interphase of land and water. Such characteristics have, since many decades, been lost in most of the rivers in Central Europe, making the Vjosa a significant ecological refugia in Europe. About 150 species are listed in the Appendices of the Bern Convention (see SHUMKA et al. 2018 this volume). The riverine landscape is also a geological and geographic monument of international significance (DURMISHI et al. 2018 this volume).

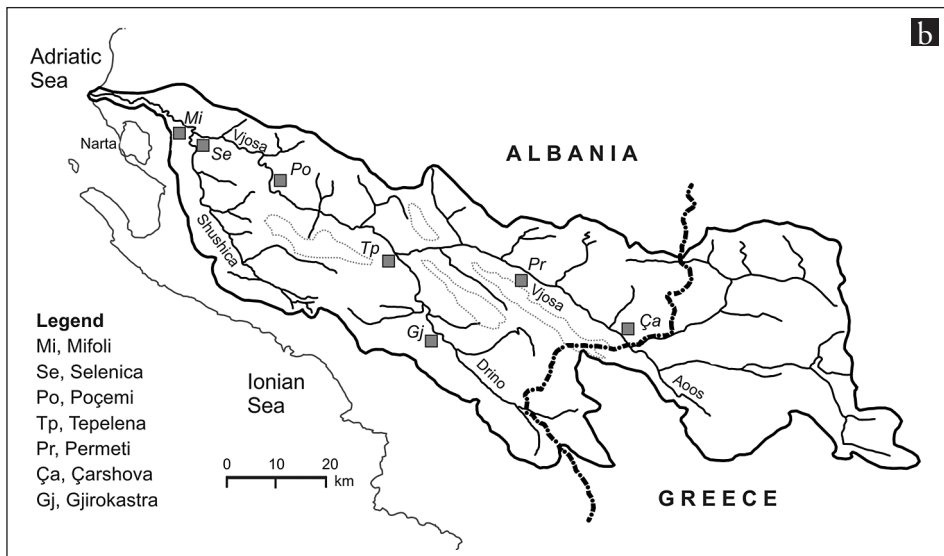
Despite these values a large number of HPPs are planned and projected in the Vjosa and its tributaries, some of them within protected areas; The most significant risk for the river as a corridor are the planned hydropower dams in Poçemi and Kalivaçi. The construction



of Kalivaçi plant started already in 2006 by an Italian company but the project came to a halt. In May 2016 the Albanian government granted a 35-year-concession to a Turkish company on the construction of Poçemi plant, which was suspended by the Administrative Court in May 2017 due to invaluable the administrative acts (<https://invest-in-albania.org/administrative-court-stops-hpp-construction-vjosa-river/>) (MIHO 2017).

In October 2017 the Albanian government announced a continuation of the Kalivaçi project by a Turkish-Albanian consortium with the same Turkish company which had failed in the Poçemi case. The Albanian Ministry of Energy and In-

Fig. 1: a) The geographic position of Vjosa/Aoos trans-boundary river, b) Hydrographic map of Vjosa basin. – Abb. 1: a) Das Vjosa/Aoos Einzugsgebiet, b) Hydrographische Karte des Vjosa Beckens.



dustry (MEI) gave permissions to build up to 500–550 HPPs (about 18 HPPs/1000 km<sup>2</sup>!), during yrs. 2005–2017 with the total generation capacity of about 2,200 MW. Some have been already constructed; others are under construction or planned for the near future. Over 100 HPPs are planned within the protected areas or potential protected areas as in the case of the Vjosa corridor or are already under construction like in Valbona National Park. The dams in the central part of the Vjosa valley would endanger one of the greatest Albanian natural values (MIHO 2017, DIKU et al. 2016, SHUMKA et al. 2010, SHUMKA et al. this volume).

### Hydropower is not a green energy

Hydropower plants can have extremely destructive and, on the long run, costly effects on a catchment. The negative ecological implications are well documented (WARD & STANFORD 1995, JUNGWIRTH et al. 2006, SCHMUTZ & MOOG 2018). Serious impacts refer to the lateral, longitudinal and vertical integrity of the entire river system, leading to dramatic changes in the specific biodiversity and functional processes. Essential parameters like hydrological dynamics, sediment load, structure and distribution, nutrients, turbidity and food resources, and temperature regime as well as overall hydraulic patterns change upstream, within the impounded section and influence largely downstream reaches (e.g. summarised in SCHMUTZ & MOOG 2018).

The environmental expertise in preparing the Albanian projects so far has been very superficial, missing ecological concepts, synergic effects, biodiversity conservation, protected areas, etc. In addition there is a lack of urgently required environmental data, and a weakness of structures to control the implementation and operation of projects. (DIKU et al. 2016, MIHO 2017, SHUMKA et al. 2010, etc.).



Fig. 2: The extensive river-floodplain system upstream Kalivaçi (Photo: SUBIC). – Abb. 2: Die Fluss-Auen Landschaft flussauf von Kalivaçi (Foto: SUBIC).

In context with the planned hydropower dams in Poçemi and Kalivaçi, decision makers, investors and stakeholders should be aware of negative consequences and major environmental threats. The profound and long-term environmental consequences of dam constructions in alluvial zones have been well documented worldwide and also in Albania. Today, this historic over-regulation of rivers necessitates costly restoration measures for compensation in many industrialized countries (NAIMAN et al. 2002, THORP et al. 2006, POFF et al. 2003, SCHIEMER 2015).

### **The environmental, socio-economic and legal concerns**

The environmental hazards are addressed by SCHIEMER et al. 2018 this volume. They refer to:

- the immediate endangerment of the national heritage mentioned above by damming of the riverscape, Vjosa delta – Narta lagoon protected area especially (MIHO et al. 2013, MIHO 2017).
- the loss of biodiversity. The highly undisturbed river dynamics and the river-floodplain ecosystems along the Vjosa are in an excellent conservation status. All riverine habitats are listed in the Annex 1 of European Union Habitats Directive, underpinning their importance for conservation at an European scale. They harbour viable communities of species that have largely or completely disappeared from other European rivers systems. Within our study, over 100 taxa of aquatic invertebrates and nearly 400 taxa of terrestrial species were recorded. Many of them are endemic to the Balkan, a high proportion (over 40 %) has been documented for the first time for Albania. A few are described as new to science (e.g. *Isoperla vjosae*, and *Liocranoeca vjosensis*) (see SCHIEMER et al. 2018 this volume, SHUMKA et al. 2018 this volume). Much higher species numbers can be expected when long-term, detailed assessments are carried out. We can predict that the majority of this specific biodiversity will disappear in the case of the planned dam constructions due to a loss of fluvial dynamics (SCHIEMER 2000).
- the loss of groundwater resources in terms of quantity and quality; i.e. Poçemi springs, drinking water supply for 30,000–40,000 inhabitants, and Kafaraj springs, drinking water supply for Fieri town of about 100,000 inhabitants (GURI 2016) (see DURMISHI et al. 2018 this volume).
- the deterioration of surface water quality due to eutrophication processes at high residence times can be expected to lead to toxic cyanobacterial algal blooms (see Albanian examples by MIHO et al. 2014).
- production of methane and other organic compounds as a result of anaerobic processes in the flooded areas causing bed smell and harmful effects to aquatic biota including humans as water user (see MIHO et al. 2009).
- coastal erosion, due to the reduction of sediment transport by the river. GURI (2016) reported that ca. 90 % of sediment load will be trapped, enhancing coastal erosion in Vjosa and Semani delta and their related protected coastal areas. Especially endangered will be the coastal dunes in both parts of Vjosa delta and the closely related Narta lagoon (see DURMISHI et al. 2018 this volume).
- The increased probability of catastrophic floods because of loss of retention zones.

Besides these environmental issues, **socio-economic ambiguities require clarification:**

- a major ambiguity is the high sediment load and the stochastic seasonal flow, which will reduce the efficiency in energy use by dam filling within a period of thirty years and reduce the cost-benefit efficiency. The sediment load transported by the Vjosa at Poçemi and Kalivaçi is very high. Detailed studies are being carried out at present by C. HAUER (in prep.).
- the dams in Poçemi and Kalivaçi would flood the agricultural land, of high production quality. Albania is ranked among the countries with very little cultivated land. Therefore, care for agricultural land should be a constant challenge (MIHO 2017).
- the total capacity of energy production will be 57 MW, with a production affectivity of 1 MW/70 ha (GURI 2016) which is a very low capacity in international terms.
- coastal erosion with negative effects for tourist beach infrastructures.

An array of operational and legal issues are of major concern:

The water management over the past 20 years has developed standardized operational procedures. In EU countries, for example, river management must follow the European Water Framework Directive, EU Natura 2000 Directive, EU Birds and Habitats Directive and EU Flood Risk Directive (ANONYMOUS 2016). Regulations stipulate that projects have to be planned within a continued monitoring in the framework of a River Basin Management Plan. This requires a proper and continued scientifically based assessment both of the socio-economy of river basin development and the reactions towards human interventions.

The most important European directives providing legal guidance regarding an environmental impact assessment are:

1. EIA Directive (Directive 2011/92/EU of the European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment) requires in accordance with Annex IV to Directive 2011/92/EU, a complete assessment of sufficiently high quality. A description of the aspects of the environment factors specified in Article 3(1) likely to be significantly affected by the proposed project. These EIA have to evaluate short-, medium-, and long-term impacts on nature and affected residents of a projected hydropower plant, and must consider alternative low-impact concepts. They have to be based on detailed assessments of hydro-morphological processes, geomorphic and ecological structure and dynamics and predictions about the impacts on specific biodiversity.
2. Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy)
3. Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora & Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. Measures have to be taken to avoid, prevent, reduce and offset significant adverse effects on the environment.
4. Bern convention  
The United Nations Convention on Biological Diversity ('the Convention'), to which the Union is party pursuant to Council Decision 93/626/EEC(9), requires assessment



of the significant adverse effects of projects on biological diversity, which is defined in Article 2 of the Convention.

#### 5. The Eel-Directive

EC (European Commission) (2007) Council Regulation (EC) No 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel. Official Journal of the European Union L248, 17–23.

## General reflections

### Economy vs. nature conservation – the red list of HPPs!

Based in the Regional Strategy for Sustainable Hydropower in the Western Balkans (WBEC-REG-ENE-01 2017), most of HPPs planned to build in Albania are small, only 44 can be considered important (with more than 10 MW). Among that list, about 17 projects are within protected areas (Valbona, Curraj, Shala, Qarrishta rivers), or potential protected areas (Kalivaçi & Poçemi in Vjosa). Such a list cannot be a 'green list' for the Albanian government, but a 'red or 'no-go' list; the total capacity of this 'no-go' list is about 535 MW, or about 24–25 % of the total planned generation capacity of 2200 MW, mentioned above.

The EU Reports for Albania always emphasized to save the pristine rivers from hydropower projects, especially in protected areas. In February 2017, the European Parliament explicitly criticized the Albanian government in regards to its hydropower policies, demanding a National Park for the Vjosa and a stop to HPP projects.

Therefore Albanian and international environmental experts strongly suggest – in order to conserve at least some part of the natural values – to take a balance between energy production and the preservation of important ecosystem which provide essential services. It is Albanians responsibility to conserve, maintain and restore the natural resources for future generations (MIHO 2017), e.g. by establishing a Vjosa National Park.

### Better knowledge (i.e. more science) is required!

The promotion of projects is haphazard and controlled by a hierarchy of stakeholder interests. We demand instead a transdisciplinary and participatory planning and decision process with clearly defined procedural steps.

Management has to be based on a well-founded understanding of the governing factors of the fluvial landscape dynamics and the ecological services of river systems and its biodiversity. This requires a truly interdisciplinary, cooperative approach (SCHIEMER 2015, SCHIEMER et al. 2018 this volume) with the goal of prognostic evaluation of the expected impact, in order to avoid undesired effects on society. Prerequisites for such an approach are well defined, science based research interdisciplinary programs combining hydrology, sediment transport processes, ecology and socio-economy. The present assessment is far from a legally binding Environmental Impact Assessment (EIA).

A platform across the science-policy interface, where science can 'speak to' policymakers, authorities and local people, requires a clear participation and decision structure. Discussions with scientists, stakeholder and persons concerned should explore scenarios for the sustainable development of the Vjosa river corridor, acknowledging the links between ecological, economic, social and cultural aspects.

Science and democracy go together (KNAW 2014). We request that Albanian politics make serious attempts to strengthen the professional knowledge and support regional capacity building. The scientific community is in debt to build up an integrated approach in regional water management.

### **International support and cooperation**

This special volume dedicated to the Vjosa River is based on a cooperation of experts of conservation biology, hydrogeology and chemistry from various Albanian, Austrian and German institutions. Several joint field trips were organized in June, 2014, October 2016, April and May 2017, March and April 2018. Two international events were organized at the Tirana University in June 2016 (ANONYMOUS 2016), and in September 2017. All these activities aim to provide an understanding of the natural values of Vjosa riverscape and acknowledge the links between the integrity of the Vjosa ecosystem and economic, social and cultural aspects of human well-being. As scientists from Albania, Austria and Germany, we all aim and recommend for an interdisciplinary research and attempt to structure an integrated assessment program by the Albanian and international experts which can help the decision makers in Albania to find ways for a sustainable development of the Vjosa River corridor.

At the Vjosa Science Conference in June, 2016 entitled ‘The Vjosa – A unique opportunity for European River Science’ scientists from Albania, Austria and Germany drafted a Memorandum about ‘Research requirements for a sustainable development of the Vjosa River corridor’ (ANONYMOUS 2016), in which we strongly recommended a 3-year-moratorium on construction plans on the Vjosa and her tributaries in order to enable an integrated assessment programme. It would have also allowed exploring the possibilities for EU funding to support sustainable development in the region. The moratorium was signed by 60 scientists, participants in the Conference, and supported by more than 220 well-known scientists worldwide. We had no reaction from Albanian Government and responsible institutions in Tirana up to now.

### **Acknowledgments**

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**Addresses:**

Univ.-Prof. Dr. Aleko MIHO, University of Tirana, Faculty of Natural Sciences, Department of Biology. Tirana, Albania. E-mail: [aleko.miho@fshn.edu.al](mailto:aleko.miho@fshn.edu.al)

Univ.-Prof. Dr. Sajmir BEQIRAJ, University of Tirana, Faculty of Natural Sciences, Department of Biology. Tirana, Albania. E-mail: [sajmir.beqiraj@fshn.edu.al](mailto:sajmir.beqiraj@fshn.edu.al)

Univ.-Prof. Dr. Wolfram GRAF, University of Natural Resources and Life Sciences, Institute of Hydrobiology and Aquatic Ecosystem Management, Gregor Mendelstr. 33, 1180 Vienna, Austria. E-mail: [wolfram.graf@boku.ac.at](mailto:wolfram.graf@boku.ac.at)

Univ.-Prof. Dr. Fritz SCHIEMER, Department of Limnology and Oceanography, University of Vienna, Althanstr.14, A1090 Vienna, Austria. E-mail: [friedrich.schiemer@univie.ac.at](mailto:friedrich.schiemer@univie.ac.at)

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Autor(en)/Author(s): Miho Aleko, Beqiraj Sajmir, Graf Wolfram, Schiemer Fritz

Artikel/Article: [The Vjosa river system in Albania: a summary of actual challenges and agendas 377-385](#)