

# **Gender, economy, environment – the Jadar lithium mine project: an opportunity or a threat for local people?**

## *A case study*

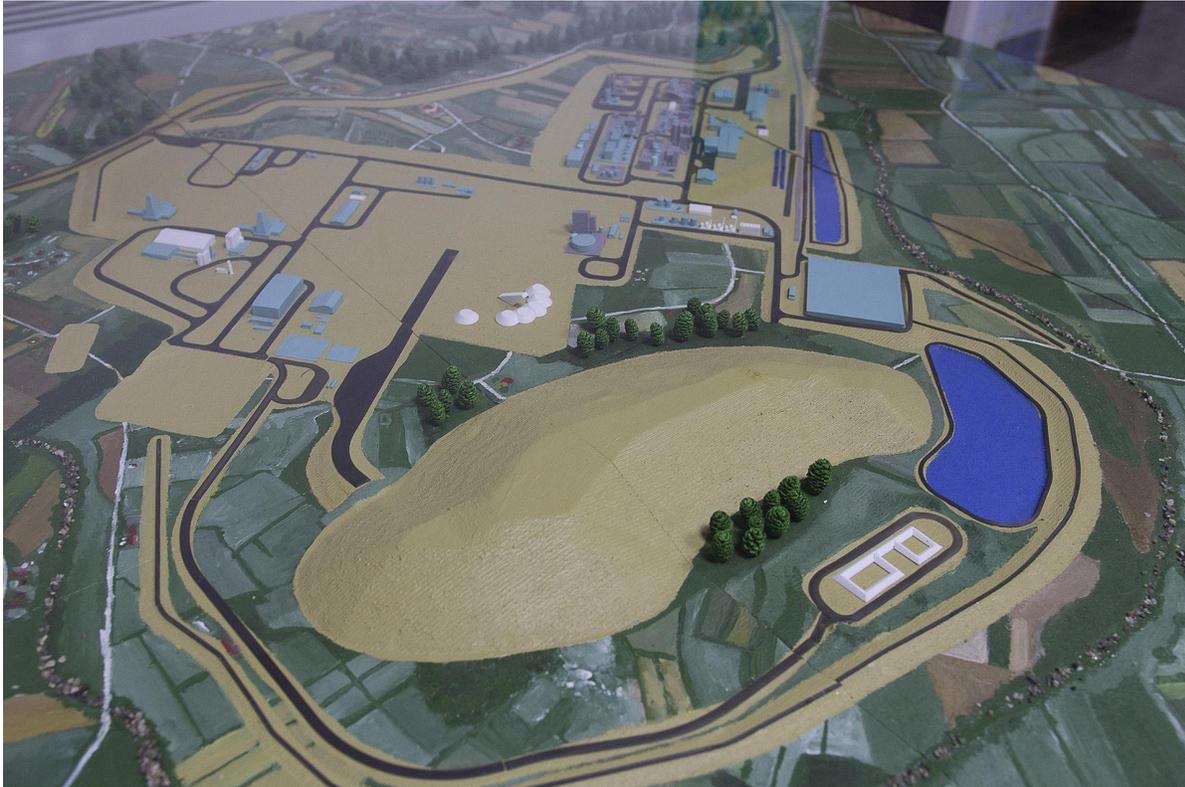
This case study takes a closer look at the proposed lithium mine greenfield project development in the Jadar valley and its possible implications -- both positive and negative -- on the local communities in the valley and beyond. Mostly due to a lack of transparency, the project has lately become quite controversial and subject to a lot of heated and politically-charged debate. This case study looks at it through the Nexus prism, and explores its gender angles and its impact on the local communities in the Loznica municipality.

### **About the project**

In 2004, near Loznica in Western Serbia, a team of geologists led by Nenad Grubin drilled two exploration holes. The probe was aimed at finding deposits of borates. In the second drilling hole, the team discovered a new mineral: lithium-sodium-borosilicate hydroxide. It was named Jadarite, after the river valley where it was found. Jadarite was later confirmed as a new mineral by the International Mineralogical Association.



The discovery was extensively covered by the mainstream media. Some UK-based media dubbed the new mineral “kryptonite”, a fictional substance from Superman’s planet. According to Bloomberg “In the shade of an Orthodox chapel, Rio Tinto has discovered kryptonite, the wonder material from Superman, which it hopes will transform its green energy business.”



In the coming years, due to an increased interest in electric vehicles based on lithium-ion batteries, the attention switched from boron to lithium. Jadarite was perceived primarily as a source of lithium. The mining rights were eventually acquired by Anglo-Australian and the world's second largest metals and mining corporation, Rio Tinto (In Spanish: tinted (or coloured) river; from the perspective of this project, the name evokes some unwanted feelings).

According to Rio Tinto, the Jadar project, one of the largest greenfield lithium projects under development, could produce 55 thousand tons per year of battery-grade lithium carbonate. At the current price of \$10 per kilogram of lithium carbonate, the total revenue could be around half a billion per year. If the projected life of the mine is 50 years, this translates in total revenue for the operator of \$25 billion. In the view of many, these estimates are somewhat conservative and possibly underestimated.

The Company keeps claiming to have communicated transparently on all activities on the project, yet, neither the project documentation nor the environmental assessment impact study

have not been finalized and presented, though the expected launch of the mine construction is in 2022.

### **The position of the environmental and civic activists**

Many environmental organizations, local NGOs and citizens voiced a strong opposition to the project. The dissatisfaction by the citizens not only in the Loznica area but also elsewhere in Serbia, grew exponentially as more exploration drilling probes in search for lithium by other mining companies were announced, in many locations in Serbia (e.g., Valjevo, Pozega, Vranje, Rekovac, Gornji Milanovac, Bukulja, Cer, Merosine, Sjenica, Jagodina ). The call to arms by the Loznica activists has become a model of citizen action against extractive activities of the international mining companies.

According to a [new spatial plan](#) for the area, drafted in November 2019 and adopted in February 2021, some 22 villages and 500 hectares were to be affected. The mine is planned to be built by the river Jadar (Drina's tributary), with underground exploitation under the river bed. Next to it will be a refining plant that will use significant quantities of sulphuric and hydrochloric acids and sodium hydroxide. The proposed changes to the spatial plan add more fuel to the fire.

Some of the principal objections by the activists were:

1. Mining and refining of lithium ore will jeopardize agriculture production that was a hallmark of this area in the Drina Basin.
2. The mining land-use fees are reportedly very low - around 3 to 5 % of the revenue.
3. There are fears that the mines will have a catastrophic effect on the environment, particularly concerning the quality of underground and waste water. Rio Tinto claims that this was not the case; the public perception nevertheless continues to be negative.
4. The land expropriation (so far, 36 households were sold to Rio Tinto) was, according to local activists, marred with harassment of the population ("if you don't sell it, it will be expropriated anyhow"). Also, the quoted price was around hundred euros per acre, which, given the value of the ore, borders on ridiculous.
5. The well-publicised practices of Rio Tinto Company across the world and its inadequate treatment of problems and accidents damaged its reputation. The level of confidence that the company would keep its promises to protect the environment is very low.

Finally, although the government committed fully to the Rio Tinto Jadar project, the government's own reputation has been compromised with how similar economic-environmental nexus problems were treated (RTB - the Bor Copper Mining and Refining, the Smederevo steelworks, Linglong tire factory in Zrenjanin, to name a few).

According to BGEN, the local organizations [asked](#) the state authorities about the proportions of the damage the Jadarite mining could cause, the technologies to be applied, as well as whether

they would have to leave their homes and why their agricultural land was reclassified as construction land. The project has also been challenged over its possible transboundary impact and its possible breach of the UNECE Espoo Convention.

The environmentalists are particularly concerned with a possible conflict of interest, as in Serbia the investor finances the ESIA study, so its finding could potentially be biased, due to the “who pays the piper calls the tune” effect.

### **The views of the academia**

The attitude of the academia towards the project is, at best, ambivalent. The contracts that Rio Tinto signed with the faculties of the Belgrade University contain a non-disclosure agreement clause preventing professors who have been engaged in the project from revealing any data in public or expressing their independent expert views.

Others have been more vocal. They focus on land degradation and environmental and social consequences. This was evident at the event: “Jadar project - what is known?” organised by the Serbian Academy of Science and Arts (SASA). The professor of the Faculty of Biology Dr Imre Krizmanic said that the only correct decision is to abandon the project. Following the event and after having analysed the available documents, [three members of SASA](#) sent a letter to the government expressing their concern that the “Jadar” project is not sufficiently transparent. They shared their belief that the project, besides enormous problems with environmental protection, would have significant demographic, social and economic (negative) implications. As the SASA event concluded, many questions surrounding this project remained. These questions revolve around the project’s real economic effects and its possible environmental and social consequences.

Dr Dragana Djordjevic, researcher at the Center of Excellence in Environmental Chemistry and Engineering of the Institute of Chemistry, Technology and Metallurgy, stressed in a 9 December 2020 [interview](#), that “the most critical part of the process of production of lithium from Jadarite is the treatment with the sulphuric acid at 250 degrees C, for which huge quantities of water and energy are needed. At such high temperatures, the acid vapours used for lithium carbonate production will evaporate into the atmosphere and corrode the vegetation and damage lungs of animals and humans. If they choose a low temperature process, then the hydrofluoric acid (HF) will be needed to break the silicate structure of Jadarite. This may generate as a by-product the extremely toxic gas silicon fluoride (SiF<sub>4</sub>) that too will be released into the atmosphere.”

### **Government still supports the project**

All governments of Serbia since 2004, regardless of their political differences, have strongly supported the project. Like its predecessors, the current government touted the project’s financial and economic potential to catalyse development of otherwise underdeveloped and increasingly depopulated areas in Western Serbia, which are predominantly oriented towards agricultural production.

In June 2021, faced with a growing discontent among citizens of the Loznica area, the government continued to insist that this project is not only about mining. The full cycle process, it claimed, would also include refining of the ore, production of lithium carbonate, manufacturing of cathodes (although, they are based on cobalt oxide), production of lithium ion batteries, even manufacturing of electric vehicles. To boost such a claim, in March the prime minister Brnabic announced that exports of lithium from Serbia might be even prohibited or restricted, in an effort to support full value chain development.

For good measure, the government confirmed that it is not only about the economy and pledged that the assessment of the impact of lithium exploitation on the environment will be transparent and accessible to the public. A referendum on this issue is also a possibility.

### **What does Rio Tinto say?**

Rio Tinto refrained from commenting on the Serbian government's idea to restrict export of its product. In a recent [interview](#) the director of the daughter Rio Tinto's company Rio Sava Exploration Vesna Prodanović invited all those who do not trust the company -- or the government -- to establish their own system of monitoring of possible environmental impact. Rio Tinto further stressed that it would help increase the budget of Loznica municipality by 60-70%, and that support programmes for the health sector and education will also be included.

It is rather strange that a project that would generate billions of profit if it received green light from the government and citizens of Serbia still does not have its own channel of communications, such as a project web-page. This indicates its still highly speculative nature.

In May 2021 Rio Tinto signed a Memorandum of Understanding with InoBat, a Bratislava-based venture capital firm that presents itself as "an R&D and battery production company with the long-term objective of serving the European market with new energy solutions". According to the MoU, Rio Tinto and InoBat will work together to accelerate the establishment of a "cradle to cradle" (i.e., one that includes waste treatment and leaves no trace behind) battery manufacturing and recycling value chain in Serbia. Their partnership will cover the full commodity life cycle from mining through to recycling of lithium. However, InoBat is virtually unknown in the world of lithium ion battery production, with no in-house research and development on battery chemistry. Its [website](#) contains no information about any market-ready lithium-ion battery product whatsoever -- not even pictures of a prototype they hope to commercialise.

So these are the circumstances surrounding the lithium mining and processing project in the Drina River Basin.

### **Lithium project through Nexus lense**

In a nutshell, the Nexus approach reconciles economic, social and environmental benefits in an optimal way. There seems to always be a trade-off between competing priorities. As mentioned in the Concept Note, the water-energy-food-ecosystems Nexus approach stems from the realization that natural resource exploration, water management, energy production, climate action, ecosystems agriculture, tourism, and economy in general, are all interlinked.

As an example of the Nexus approach, let us take the link between water management and agriculture. The underground water in the planned mining area is by definition saturated with boron compounds such as Jadarite (for if it is not, there's nothing to mine - "no boron, no mine"). The trouble with Jadarite is that each of its molecules ( $\text{LiNaSiB}_3\text{O}_7\text{OH}$ ) has three atoms of boron. Although boron is a micronutrient in a narrow range, even its slightly increased levels may lead to the so-called [boron toxicity](#). Plants that take in too much boron initially display yellowing or browning of foliage. Stunted growth is quite common, and fruit trees may become less productive.



According to a [recent report](#) by BIRN five local citizens from the Loznica area have already been compensated by Rio Tinto because of spillage of underground boron-rich water during the prospecting and exploration activities. The underground water reached their crops and caused the boron browning.

The citizens are concerned that such accidents may become a norm along the Jadar valley when/if the mine begins production. Some say that if Rio Tinto succeeds in exporting lithium, Serbian people known for producing slivovica brandy might end up importing it.

### **Gender perspective**

Let's now look at this development through a "gender lens", or, if you like, let's inspect it even more closely through a "gender microscope", by inviting interested parties, both global and local, to share their views.

The primary questions to explore are:

How will the opening of the mine impact lives of men, women and children in the immediate area (the Jadar valley) and beyond (Western Serbia, particularly downstream along the Drina and Sava rivers)?

Besides the families that will have to relocate from the immediate vicinity of the mine, how many more families will have to abandon their ancestral villages? In what radius from the mine?

How would the opening of the mine affect those who opt to stay near it? How would it affect their safety, health and businesses? A particular concern here is the wellbeing of numerous single-member households that, in most cases, are women?

How would the mining and refining affect semi-industrial agricultural production near the mine and in the wider area? Are the effects of boron toxicity -- on plants, animals, humans - fully understood?

Water management: who and how will monitor the quality of water in the valley and at the confluence of Jadar and Drina?

How many new jobs for men and women will be created by opening the mine? Will these new jobs be offered to the local population, or to other, possibly foreign, workers? What will be the gender structure of newly created jobs?

How many current jobs in primary (e.g., agriculture) and tertiary (e.g., tourism) sectors might be lost? What will be the gender structure of the job lost?

How the cultural heritage and the identity of local people in the Jadar Valley might be affected by this development (including the chapel mentioned by Bloomberg?)

Do the benefits of this project indeed outweigh its potential drawbacks? Can such calculation be done in monetary terms? Is wellbeing -- and its gain or loss -- measurable?

Now we will ask our panellists to give their views. Today we have with us:

Dr Dragana Đorđević, naučni saradnik Instituta za hemiju, tehnologiju i metalurgiju, Research Associate, Institute of Chemistry, Technology and Metallurgy of the Republic of Serbia

Marija Alimpić, predsednica udruženja “ Zaštitimo Jadar i Rađevinu”, President of Association “ Let’s Protect Jadar and Rađevina”

Ana Pavlović, vlasnik Agencije za turističku promociju Cera, osnivač neformalne inicijative EKO CER, The Owner of Tourist Agency for Cer Promotion, founder of EKO CER initiative

A representative of Rio Tinto (invited)

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