

Analysis of the justification of geological research and potential mines in relation to agriculture in Jadar, Radjevina, Pocerina and Mačva (Negative and economically unprofitable territorial retraining of the Mačvan district)

In mid-February, we started collecting data on the most common fruit and agricultural crops grown in the area of [Jadar](#), Radjevina, Mačva (without Bogatić) and Pocerina, in order to see the average yield and income from the above-mentioned crops so that we could make a justification analysis geological research and potential mines in relation to agriculture, all because of the claims of high officials of the Government of the Republic of Serbia who support the opinion that “[the future of Serbia is in mining](#)”. In the middle of February, there was still no mention of the war in Ukraine, and with the beginning of the war, it turned out that agriculture is actually a very important economic branch both for Serbia and for the whole world.

So let me start from the beginning

In this research, as we stated at the beginning, we included areas in the **Mačvan region** that would be directly threatened by mining activities. The relevant sources on the basis of which we collected the data on the area under wheat and corn plantations were obtained based on the data of the Republic Institute of Statistics. For data on fruit crops for the area of Jadar and Radjevina, our source was also the Republic Institute of Statistics, with the fact that there we went to the most common fruit crops grown in the above-mentioned areas, such as plum, apple, pear, sour cherry, cherry, hazelnut, raspberry, blackberry, strawberry, blueberry, vine. As for the data for Mačva (without Bogatić) and Pocerina, we received the data from the Agricultural and Advisory Expert Service Šabac, thanks to the courtesy of the senior expert associate for fruit growing.

Furthermore, for the price of wheat and corn, we took the average price in the last 3 years, which we reached based on the official source, which is the Ministry of Agriculture on the purchase price of cereals, and for the prices of fruit crops, the information obtained from the Agricultural and Advisory Service of Šabac helped again as well as data obtained from fruit growers, for which we are infinitely grateful to all of them. With the fact that it must be noted that the prices in dinars were converted into the value of euros, to make it easier for everyone to see the total annual average income and for reasons of comparison with the profit that the Republic of Serbia would achieve from the mineral rent, which is expressed in euros, not in dinars.

Considering that the 2 projects Jadar and Petlovača are in question, and that the Jadar project is divided into two parts, Jadar and Jadar North, that two mining multinational

corporations Rio Tinto and Volt Resources Limited and a Serbian company PD will participate in these projects. “Edelweiss Mineral Exploration” d.o.o. from Belgrade, which should cooperate on the Petlovača project with the already mentioned multinational corporation **Volt Resources Limited from Australia**, while we currently only have data on investments and income from ore exploitation from Rio Tinto, for this reason we focused on the available data, considering that they occupy the largest exploration and potentially the largest exploitation area in these areas. In this analysis, we will consider Rio Tinto’s data as parameters for both projects.

The purpose for which everything mentioned above is written is to see that the data used is not a source of personal assessment, but that they are official and very easily verifiable sources.

Now let’s get down to the point

The development of mining, as a primary economic and industrial branch, in a densely populated and fertile rural area leads to territorial prequalification, which will lead to the relocation of the population and turn the rich region, which already brings income from agriculture, from an area with fertile arable land into an endless expanse of barren land in the investigation areas of Jadar, Jadar North and Petlovača.

According to [Rio Tinto](#), the “Jadar” project, one of the largest “greenfield” projects, could annually produce about 55 thousand tons of lithium carbonate of the highest quality (used for batteries). With a price of about \$10 per kg of lithium carbonate, the gross annual revenue could be about half a billion dollars (the price data is from before the start of the war in Ukraine). If the projected life of the mine were about 50 years, as planned, this means that total revenue could reach \$25 billion. According to the PPPPN for the Jadar project, which was adopted in 2021, then canceled by the Government’s decision in January 2022, regardless of the cancellation itself, Rio Tinto continues its activities in the purchase of land, and Volt Resources Limited, through their company Asena Investment, which submitted the request for geological research in the area of North Jadar is still awaiting approval from the competent Ministry of Mining and Energy.

This **PPPPN** for the Jadar project includes 22 villages and 500 hectares of arable and fertile land. The mine is planned near the river Jadar (the right tributary of the Drina), with underground exploitation and under the riverbed itself. In addition to the mine, there would also be an ore processing plant (“refining”) that would use significant amounts of sulfuric and hydrochloric acid, as well as sodium hydroxide. According to all the above data, the gross annual income would amount to 500 million euros, the Republic of Serbia would earn from 3% to 5% based on the mining rent for land use, when we convert these percentages

into a monetary value, we arrive at a figure between 15 – 25 million dollars per year. Why are we referring to the PPPPN for the Jadar project? We are calling because in the Spatial Plan of the Republic of Serbia from 2021 to 2030, the area of Jadar, Radjevina, Petlovača and partially Pocerina is earmarked for mines. Precisely for mines Li and B, as stated, “strategic ore raw materials for the Republic of Serbia”. According to that PP, agriculture is recognized as an economic branch, but it will not be able to develop due to several factors, which are the population that will be relocated, the fertile arable land that will be devastated, and the pollution of groundwater and river watercourses that now irrigate arable land, agricultural and fruit growing areas. As for the official data on the negative impact of geological research and mines on the environment, the members of SANU, then the Biological Faculty – University in Belgrade and numerous experts who deal with this issue gave their expert opinion.

The data that refutes the many times mentioned mantra “that mining is the future of Serbia” are the data on areas and annual yields under cereals and fruit crops. As for the annual yield data, they depend on the meteorological conditions that affect the crop, and thus the price of the product.

CEREALS

(Jadar, Radjevina, Pocerina and Mačva without Bogatić):

In the territory of the city of Loznica and the municipality of Krupanja (area of Jadar and Radjevina), there is a total of 27,189ha of fertile arable land under wheat and corn, the average annual yield of wheat is 80,350,000 kg or 80,350 tons, the average annual corn yield is 44,368,000 kg or 44,368 tons. In the territory of the city of Šabac (Pocerina and Mačva without Bogatić), there is a total of 58,139ha under wheat and corn, the average annual yield of wheat is 184,885,000kg or 184,885 tons, the average annual yield of corn is 88,648,000 kg or 88,648 tons. On an annual level, the total average income from wheat and corn in the value of – 90,500,000 euros are realized in all three municipalities!

FRUIT CULTURES

(Radjevina, Jadar, Mačva without Bogatić and Pocerina):

Data on the following fruit crops were used for all three municipalities: plum, apple, pear, sour cherry, cherry, hazelnut, raspberry, blackberry, strawberry, blueberry, grapevine. With the fact that for the municipality of Loznica there are no official data on the cultivation of cherries, and for the territory of the municipality of Krupanja there are cherries, blueberries, and vines.

In the territory of the city of Loznica and the municipality of Krupanja (areas of Jadar and Radjevina), there is a total of 3,305ha under fruit crops, and in the territory of the town of

Šabac, the area under fruit crops is 5,510ha. On an annual level, in all three municipalities, the total average income from fruit crops in the value of - 87,632,245 euros are realized! In the Mačvan district, on the territory of the towns of Šabac and Loznica and the municipality of Krupnja or the area of Pocerina, partially Mačva (without the municipality of Bogatić), Jadar and Radjevina, the total average income of 188,946,420 euros is realized annually from the cultivation and sale of fruit and agricultural crops.

So, here we are not talking about the data that could be achieved, here we are talking about the ACHIEVED total average income.

Vegetable crops and livestock in all three municipalities were not included in this analysis. Also, there is a lack of data on the annual income from honey, for which this region is very famous, and which is not negligible.

Now let me explain why only cereal and fruit crops were taken. They were taken since the largest number of arable areas and lands in Jadar, Radjevina, Pocerina and Mačva (without Bogatić) are under these agricultural and fruit crops, from which the highest income is generated.

In the further analysis of the assessment of the justification of geological research and potential mines in relation to agriculture, we go to the quality of cereals and fruit crops, which directly depend on irrigation and water quality. Not only agriculture depends on the water quality in this area, but also the population that lives here.

Mining around Jadar, Radjevinia, Mačva and Pocerina can cause irreparable and incalculable damage if it continues to be pursued. In addition to the economic reasons that we have mentioned, there is also a negative impact that is directly related to groundwater, river watercourses and nature.

When it comes to the main sources for irrigation of agricultural and fruit-growing areas, as well as water used by the population as drinking and household water, the data are as follows:

Jadar for irrigation of fields and orchards uses:

- 51% - underground water (wells and springs)
- 30% - surface water (natural lakes, rivers, and other watercourses)

The product for irrigation of fields and orchards uses:

- 69.9% of surface water (natural lakes, rivers and other watercourses)
- 9.8% of underground water (wells and springs)

Pocerina and partially Mačva (without Bogatić) for irrigation of fields and orchards are used by:

- 87.4 % of underground water

-8.7 % of surface water

The rest of the irrigation comes from reservoirs or artificial lakes.

Therefore, from all the above, it can be concluded that geological research and mines, with their negative impact on river watercourses and underground water, would have a devastating effect on the population, and the areas under wheat, corn, and fruit crops. The reason for concern is the contaminants that will enter the river courses, primarily B, which will pollute this clean groundwater. We already have examples from Valjevo in the case of Euro Lichium, where geo research was suspended due to a large amount of dangerous and polluting substances in the water caused by geological research, where analyzes established high concentrations of boron, sodium and iron in wells where surface and underground water mixed.

In the area of Jadar, Radjevina, Mačva and Pocerina, water is used without any treatment for drinking by the population. In commercial mining, as is the case here, there is no cheap ore extraction technology that can meet all environmental standards.

Given that all the fruit crops grown in this area are exported to the EU and other markets in large percentages and that they bring profit to the growers, but also to the local governments, in the event that geological research is continued and if a mine is opened for that more there will be no possibility. High criteria and certificates on the quality of fruit and agricultural products required by importers from the EU will not be met. As a result, large amounts of fruit, wheat, and corn will remain in the state, and growers and exporters will suffer millions in damages, which the state will not want and will have nowhere to compensate them.

Another important thing about the water in the area of Mačva is that it is rich in underground water that is at a depth of 20m, sterile and bacteriologically correct, the capacities of which, in addition to supplying the city of Šabac and rural settlements with drinking water via the springs "Tabanović", "Mali Zabran" and "Mačvanski Prnjavor" enable the supply of wider areas and the construction of regional and inter-regional water supply systems, which according to the Water Management Foundation of the Republic of Serbia is determined as an area belonging to the Mačvan regional water supply system. Also, in the area of Mačva, especially in the research area of Petlovač, the existence of geothermal waters has been proven, which in the future can be of great importance as a renewable energy source. (The source of data on water quality in the area of Mačva and the Petlovača Research Area was obtained on the basis of information of public importance from the Department of Urban Planning of the city of Šabac).

In the research area of Jadar North, which includes the hill of Iverak and the villages

between Iverk and Cer, the villages are supplied with water from the springs and rivers that rise on the Cer Mountain and underground water from this area. Also, in this area, in the village of Banja Badanja, which is in the Cernica river valley, there is a source of sulphurous-ferric water and mineralized mud that is used for the treatment of rheumatic diseases. Exceptionally high-quality and balneologically tested waters used by the population of this area will be threatened and contaminated by geological research. JP "Vodovod i kanalizacija" Loznica, in the research area Jadar North, has two springs Gornji Jadar 4 and Gornji Jadar 5.

As we can conclude from everything already mentioned, when it comes to water and water resources, the population will literally be left without drinking water. Residents who do not sell their land for the mine, under the pressure of the multinational corporations Rio Tinto and Volta, will have to move away and will become ecological refugees from the hosts. For this reason, applied geological research and exploitation of Li and B around Jadar, Jadar North and Petlovača must be abandoned and permanently prohibited.

The data that is most important, when the total arable areas under cereals and fruit crops are taken, they amount to 94,134ha. About 800ha of the total area in Jadar, Radjevina and Mačva (without Bogatić) will be permanently devastated and unusable due to potential mines. Due to the negative impact of the mine and pollution of underground and surface water, 93,343 ha of fertile and arable land will be directly or indirectly threatened. The next important piece of information is that the mentioned 800ha includes a total of 29 villages in the Jadar project and the Petlovača research area, with a population of 31,776, according to the latest population census from 2011.

Therefore, 31,776 inhabitants earn income from the cultivation of agricultural land and the sale of agricultural products on 800ha of arable fertile land that will be irreversibly devastated, of these 31,776 inhabitants, we already know for a part of the population around the Jadar project that they will be relocated, i.e., evicted from their centuries-old estates that have been owned by their families for generations. According to the Jadar project and the report given by Rio Tint, 1,000 people should work in the mine, in fact, according to the data available to the associations KORS and Protect Jadar and Radjevina, that number is 312 jobs. For the exploration area of Petlovača and the potential mine Li i B, which is planned there, we do not have that data for now.

And now we come to the point

Let's go back to the beginning of the text and the profit not from the mining rent, which would amount to 15 to 25 million euros annually, but to Rio Tinto's gross annual income of 500 million euros. When we look at the data on the achieved average income from

agriculture in these areas and that it amounts to about 200 million euros now, and that the income would be increased by subsidies and various tax breaks with which the state would encourage and support agricultural production, we practically arrive at the same profit figure agriculture and mining. With this difference, we will say, a huge difference and very important facts, which is that the projected life of the mine is 50 years, and fertile arable land, clean water, clean air and nature do not have a limited shelf life, but profits and money can only increase and fertilize with capital investment in agriculture. When we talk about agriculture, it employs all the working population living in that area, what is even more important, property owners have a much greater incentive to work, because they work on their land, which they leave to future generations. So, we are not talking about the direct employment of 31,776 people here, we are talking about the employment of the next generations.

In this analysis, we focused on agriculture, but let's not forget the city centers of Šabac and Loznica, as well as the municipality of Krupanj, where the IT industry, processing, food industry, etc., can be developed. A special branch of the economy that has enormous potential and with investment can bring an extremely large income is tourism.

Now we come to the war in Ukraine

So, since Ukraine and Russia are the biggest exporters of grain and corn, Russia of fertilizers, the world economy is in big trouble. According to the data of world stock exchanges, the price of wheat and corn has reached its historical maximum. Many countries in the world focused on the import of agricultural and food products and thus became dependent on imports. Not developing our own agriculture and relying on imports will now cost many countries that are on the verge of a shortage of basic food products for the above reasons. Due to the increase in fuel and gas prices, according to Gabriel Ferrer, president of the World Food Security Committee (Committee on World Food Security), "European countries will also not be spared - especially by the rapid escalation of energy prices that will increase the price of basic food products."

This is not just a problem between Russia and Ukraine, it's a problem for all of us."Also, the thinking of Rick Van der Ploeg, a professor at Oxford University in England and one of the world's leading experts, is very interesting. He says the following: "The fact that most countries in the world depend on food imports to feed their population has created a web of dependence. This network is basically controlled by a small set of large and powerful food empires," he said, adding that "food sovereignty is coming to the fore as the most important beacon of agricultural and rural policy development in the future."

So, based on everything said by world experts in the field of economics and international

institutions, countries that have developed agriculture and food industry will be at a huge advantage, in fact they are already at a huge advantage. Serbia is a country that has not only Mačva zitnica, but also Vojvodina, Šumadija. We also have a developed livestock fund, which is being destroyed by the state by reducing the purchase price of livestock and meat and by increasing imports from other markets. In addition to all that, we still have fairly clean rivers, thanks to which we are one of the few countries in the world that does not use bottled water for drinking, but tap water. Therefore, we have all the conditions to be completely independent in terms of food and water in relation to the world market, which is currently suffering from tectonic disturbances and where there is currently no end in sight as to how everything will end, regardless of when the war in Ukraine ends.

Considering all the analyzes we have presented in this paper, we assume that Serbia must not allow geological research and the opening of mines that will have a negative and degrading impact on agriculture, nature and people. Especially now, when we see from current events that food and water are of inestimable value for the world, or to explain more plastically: we can heat, drive, have telephones, computers and all modern technology with ores, gas, gasoline, but we cannot eat or drink them and breathe to live.

With that, we must set priorities in the development and preservation of our own economy and economy without the territorial retraining of the entire country in mining activity.