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Infrastructure and Spatial Transformation of Mrzla Vodica Village in Croatia

Abstract: Infrastructure projects, encompassing the construction of roads, railways, power facilities, and other structures, have a tangible impact on the physical landscape. When implemented within or through a settlement, these projects also influence cultural and social aspects of life. Despite their intention to enhance citizens' well-being as part of modernization endeavours, infrastructure initiatives often produce uneven effects on different social groups. This study focuses on the transformative processes that unfolded in the village of Mrzla Vodica, located in Gorski Kotar, Croatia, following the construction of the Lujzijana Road in the early 19th century and a dam in the mid-20th century, and all the way to the present day. Employing a classic ethnographic approach and a literature review, this research aims to demonstrate how infrastructure can generate both prosperity and significant disruptions to space, potentially leading to the decline or even disappearance of a certain community. By shedding light on the inequality produced by infrastructural development, this study tries to contribute to a deeper understanding of the modernization processes in rural areas.

Key words: infrastructure, roads, dam, modernization, inequality, Croatia, rural area

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Introduction

Infrastructure refers to the physical and organizational structures and systems that support the functioning of a society. It represents the basic systems and services and includes elements such as transport and communication systems and electricity and water supplies (Cambridge Advanced Learner's Dictionary & Thesaurus, 2023; Cambridge Business English Dictionary, 2023). It changes the world in significant ways and is ubiquitous in almost every corner of the globe. However, infrastructure is not only a functional system, but also social, cultural and symbolic one. Despite potentially sharing technical specifications, no two infrastructures are identical; each one is shaped by social and cultural factors (Dalakoglou 2017, 11). The theoretical framework for the study of infrastructure in social anthropology draws on a range of concepts and approaches (Larkin 2013). As a social phenomenon, anthropologists have begun exploring its multifaceted impact, which can be observed across various levels. Through infrastructure, distribution of resources and power that underlie the development can be studied, examining the economic and political structures that shape access to infrastructure and the social inequalities that result. Another way to study it is through the material objects and artefacts that comprise infrastructure, as well as the social meanings and values attached to them, demonstrating how infrastructure shapes social identities and practices, and how it is used to express and negotiate social values and beliefs. Exploring everyday actions and behaviours of individuals and groups in relation to infrastructure shows how people interact with and adapt to infrastructure systems, and how these interactions shape social norms and practices.

In this paper, infrastructure is observed as a social space, emphasizing the intricate relationships between infrastructure, landscape, and society. Through this lens, social anthropology examines the material and immaterial dimensions of infrastructure's impact on the social and cultural life of a community. Infrastructure is a material, social, and political construct that promises modernity, growth, and advancement, a space where societies are moulded and transformed. However, typically indeed viewed as a modernization effort demonstrating a modern state's progress, infrastructure can paradoxically contribute to disconnection and marginalization leading to differentiation of population and inequality.

The scope of this paper is the village of Mrzla Vodica located in the mountainous region of Gorski Kotar in Croatia, which is today a part of the Lokve municipality. Area of Gorski Kotar has always been an important transit corridor connecting the northern Adriatic coast and the continental part of Croatia (and Europe). Historically, because of its marginal position, isolated location, and weak agrarian possibilities, the region struggled to fit into Croatia's economic and political life (Pavić 1981, 12). Moreover, the region's rugged terrain and dense forests make it a challenging environment for planning transit system route. However, the political and economic interests of Austria and Hungary

towards the northern Adriatic ports since the 18th century, led to the construction of macadam roads,¹ and railway tracks² in 19th century. In this context, the region's strategic location makes it a natural transit corridor, and this has played a crucial role in its history. The region's roads and railways have been used for centuries to transport goods and people from the Adriatic coast to the rest of Europe and vice versa. Today, Gorski Kotar continues to play an important role in the road transit of goods and people: it is home to the A6 motorway,³ which connects the city of Rijeka with the capital city of Zagreb and beyond to other parts of Europe.

The impacts of infrastructure construction as part of modernization process in Gorski Kotar undoubtedly hold great significance for the development and progress of the area. However, due to disparities of modernization processes in Croatian regions, as well as the rapid urbanization and industrialization of surrounding cities, and centralization after the Second World War, Gorski Kotar has experienced a significant demographic decline, and is labelled as Croatian peripheral region, particularly from an economic perspective (Banovac, Blažević, and Boneta, 2004). Today, Gorski Kotar shares a similar fate to many other rural areas in Croatia: depopulation. Key contributing factors include the lack of employment opportunities, limited career options, lower income compared to urban areas, and dissatisfaction with social services, healthcare, and community infrastructure (Grgić, Žimbek, Tratnik, 2010, 158). Nonetheless, the region's importance in terms of transportation has been consistent since the days of caravan routes, and with the growth of urban centres outside the region, its significance has only grown. Paradoxically, in the 21st century, while modern transport infrastructure facilitates transit through the region, it also encourages

¹ With the end of the Great Turkish War (1683–1699) and the shifting of borders, at the beginning of the 18th century, there was a need to build macadam roads along the lines of the old caravan routes (Feletar 2016, 40). The construction of the first mountain macadam road in Gorski Kotar, which was also the first direct connection between continental Croatia and the seaside, began in 1726, and was put into traffic two years later (Černicki and Forenbaher 2014, 13). It was named Via Carolina Augusta after emperor Charles VI (Černicki and Forenbaher 2014, 13).

² The plan to build a railway through Gorski Kotar already existed in the first half of the 19th century, and it was mainly supported by Hungarian circles (Feletar 2016, 72–73). The railway connecting Budapest to the Adriatic Sea was built in 1873 through Gorski Kotar. It was put into service in 1875 and it belonged to the Hungarian state railways (Chylak 1981, 169).

³ Rijeka – Zagreb or A6 motorway (Bosiljevo II – Rijeka) is a part of the A1 motorway (Zagreb – Bosiljevo II – Split – Ploče). The construction of the A6 motorway began in 1970 and was put in use in phases. In 2004, the cities of Rijeka and Zagreb were connected with some sections of the motorway still to be finished. The motorway was completed with a full profile in 2008.

further emigration and hinders regional economic development (Feletar, 2016: 225; Lukić, Opačić, and Zupanc, 2009).



Map 1 Map of Croatia with the location of Mrzla Vodica
(My Maps by Google, 2023)

Two pieces of large infrastructure that intertwine within a small area in Gorski Kotar are the reason why Mrzla Vodica village is chosen for this research. First of them is the Lujzijana Road, constructed at the beginning of the 19th century. It was passing through Mrzla Vodica and has brought new life to the village, providing new economic possibilities. Even though paths and macadam roads already existed in this area, the Lujzijana Road's route was passing through more suitable terrain and is considered modern for the time. There are numerous villages, like Mrzla Vodica, that developed along the newly built Lujzijana Road. However, 150 years after the road construction, part of the area of Mrzla Vodica was turned into a lake, due to the construction of the dam in a nearby village, Homer. The dam is part of the hydropower plant Vinodol,⁴ and its reservoir-lake covers more than 2 km² of the area. The reservoir-lake flooded populated area, including 5.5 kilometres of the Lujzijana Road. The construction of the dam caused a major spatial transformation of Mrzla Vodica and disturbed the road traffic system of the area, even though a bypass road was built, often called the New Lujzijana Road.

⁴ Hydropower plant Vinodol was put into operation in 1952 and it was a plant whose annual production accounted for about 45% of the total electricity produced in Croatia in 1939, about one-seventh of the total production of Yugoslavia in the same year and almost 70% of the projected capacities that should have been built in Croatia at that time (N. Glad 1997, 29).



Map 2 Position of Mrzla Vodica and Lokve, the original route of the Lujzijana Road, the New Lujzijana Road, and the dam with reservoir-lake (Automobile Map of Croatia, 2023; routes and locations traced and plotted by author)

The construction of two crucial infrastructural elements in Mrzla Vodica has had a substantial impact on the physical appearance of the village and surrounding landscape, as well as on the social fabric of the community. This paper aims to examine the changes that have occurred in Mrzla Vodica as a result of these two infrastructure projects; how social practices are influenced by the infrastructure and performed, and how they are related to broader social, political, and economic processes. The paper tries to contribute to our understanding of how infrastructure can play a vital role in regional and national development, but can also have negative consequences at the local level, such as underdevelopment, isolation, and even the disappearance of a community.

Theoretical and Methodological Framework and Structure of the Paper

Once built, every infrastructural project is a novel element in space. However, infrastructure is changing over time: its materiality, conforming social and political perturbations, in relation to other built infrastructure, and – consequently – by the perception of those who build it, use it or live by it (Masquellier, 2002; Löfgren, 2004; Hetherington and Campbell, 2014). Aimed at understanding the complex relationships between space of infrastructure and society, this case study is built on contextualization, that is, analyses of social factors that are part of the process of the production of the space, such as historical facts, political and ideological data. On the other hand, the same space is examined through the lens of social construction of the space, a process that includes social relations, perspectives, attitudes and daily usage of the material space, a process which

transforms the space by giving it certain meanings. Social production and construction of the space are two deeply intertwined concepts discussed by Setha M. Low (2000), arguing that understanding of both processes reveal and shed light on wider social issues.

The research is based on desk research and fieldwork conducted intermittently from 2015 to 2023 in Mrzla Vodica, Lokve and Rijeka. Qualitative data is obtained from the semi-structured interviews, and quantitative data is extracted from publications and censuses. Author's photographs and photographs from private archives is used to visualize data presented. The web services Automobile Map of Croatia (*Auto Karta Hrvatske*) and My Maps by Google are used to create customized maps in order to present locations of settlements and routes between them. The web service Google Maps is used for calculation of distance between settlements.

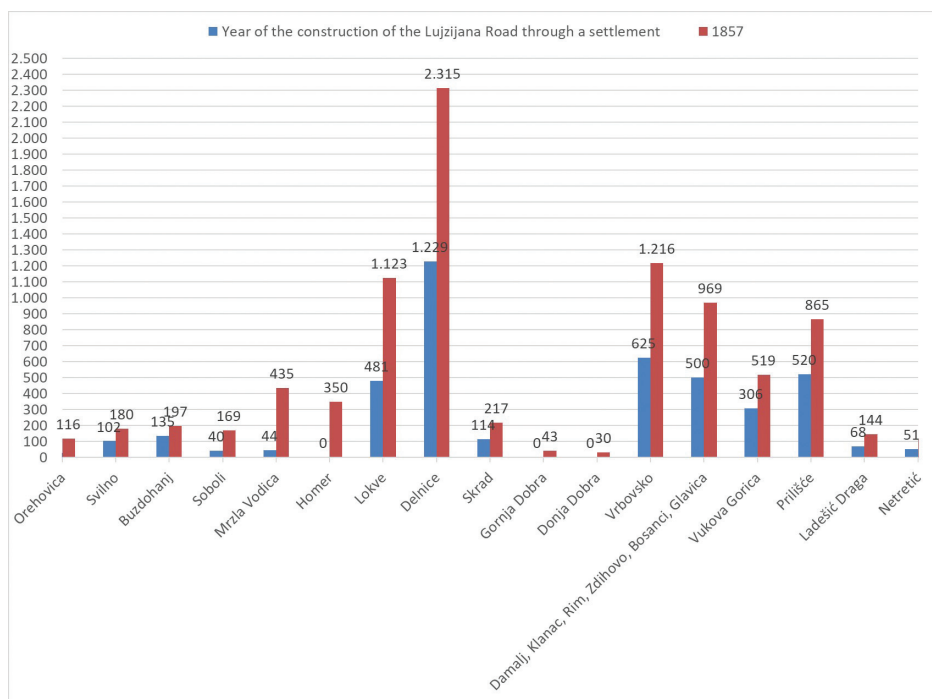
Data is presented chronologically. In the first part of the paper, historical, demographic and economic data of Mrzla Vodica will be given, from the construction of the Lujzijana Road until the beginning of the World War II. In the second part of the paper, data about short but turbulent part of the history connected with World War II will be presented. This part consists of description of events and data associated with the construction of the dam and the lake, as well as the data until 1980s as consequences of the construction of the lake. In the last part of the paper, the present state of the village will be observed, presenting paradoxical role of infrastructure.

Mrzla Vodica and the Lujzijana Road

The construction of the Lujzijana Road began in 1803 in the city of Rijeka, and finished in 1811 in the city of Karlovac. In its original trajectory, the Lujzijana Road was 18 Austrian postal miles or, approximately, 134 kilometres long (Černicki and Forenbaher 2012, 27). It was named after Maria Ludovika, wife of the Austrian Emperor Francis I (Chylak 1981, 168).⁵ It marked a turning point for the development of the region and many settlements were established owing it to the Lujzijana Road. Villages Osoj, Srednji Jarak, Homer, Zajez, Artić, and Mala Voda were mentioned by linguist Rudolf Strohal (Strohal [1935] 1993, 53, 56–57), while historian Milan Kruhek mentions Sopač (Kruhek 1981, 306). Although Mrzla Vodica existed before the road's construction, only 44 residents

⁵ In 1808, Emperor Francis I allowed the new road to be named Via Ludovicea after his third wife Maria Ludovika (Chylak 1981, 168). Because the road was completed during the time of French administration, it was wrongly believed that the road was named after Napoleon's second wife, Marie Louisa, daughter of Francis I (Černicki and Forenbaher 2012, 27).

were registered during the road's construction period through the village. The origin of the name Mrzla Vodica is likely derived from the Mrzlica creek, which was mentioned during the time of the Zrinski and Frankopan families.⁶ Flint sand was excavated in the area and glass was produced there, while sawmills were also present on the same creek (N. Glad 1997, 96; Strohal [1935] 1993, 56). Settlement in the area began during this time, with new residents attracted by excavations of iron ore towards the end of the 18th century. However, like in other settlements alongside the road, the definitive demographic development in Mrzla Vodica occurred after the construction of the Lujzijana road. After construction of the road through the village in 1805, Mrzla Vodica saw the largest increase in population, with the number of residents rising to 435 by 1857 (DZS 2001), representing an increase of 9.88 times (graph 1).



Graph 1 Number of residents in the year of the construction of the road through a settlement (1803–1811), and number of residents in 1857 (Jarec, 2021; data taken from M. Glad 2014, 16; 42–48, and DZS 2001)

⁶ Frankopani and Zrinski are among the most important and well-known Croatian noble families. For centuries, they were the bearers and defenders of Croatia against the superior Ottoman invaders, but also determined opponents of the Habsburg imperial absolutism.

Immigration can be traced through registered foreign surnames: between 1805 and 1885, the largest number of surnames were registered in the first 24 years after the road's construction (29 surnames, or 72% of the recorded period) (Jardas 2002, 18). The appearance of foreign surnames from various regions such as Austria, Hungary, the Czech Republic, Slovakia, Saxony, Carinthia, Carniola, etc. can be explained by the arrival of workers who were involved in glass production, mining, sawmilling, road and bridge construction. Additionally, domestic surnames that were not previously registered and were not indigenous to the area belonged to those from coastal area who came for the construction of roads and bridges but eventually settled in the region (Jardas 2002, 18–19). Church of St. Ana in Mrzla Vodica (photo 1), which was already mentioned in 1805 (Strohal [1935] 1993, 54; N. Glad 1997, 102), was located next to today's lake. On the triumphal arch in the interior of the church was a carved inscription of 1850, which indicates that the church was substantially renovated that year (N. Glad 1997, 85–86). On the exterior walls of the church, signs of reconstruction and repairs were visible, and on the bell tower, in front of the entrance facade, one more year of repair, 1904, was marked.



Photo 1. Church of St. Ana in Mrzla Vodica around 1910 (private archive)

Because the Lujzijana Road leads from Mrzla Vodica uphill towards the villages of Osoj and Ravno Podolje, and onwards towards Gornje Jelenje, the residents of Mrzla Vodica were teamsters who used oxen and horses to provide additional traction for carts (Strohal [1935] 1993, 52). Even today, locals regard Mrzla Vodica as a prosperous settlement during that period, primarily due to the Lujzijana Road:

People had oxen and horses and they made good money with traffic in the Lujzijana because they were teamsters. Especially Mrzla Vodica, pulling out the load up to Osoj... The people of Mrzla Vodica lived well because they were teamsters. (Sixty-year-old woman from Lokve)

Road stations, inns, lodgings, stables, and other similar facilities were necessary to be built in this particular part of the road. The Lujzijana Road Society⁷ played a significant role in this regard, advancing the municipality of Lokve by constructing buildings along the road in the area, which functioned as stations for travellers (Strohal [1935] 1993, 59). These stations became a vital part of the settlements in Gorski Kotar, and the arrival of guests in these junctions positively impacted social life (Knežević and Grbac Žiković (2013, 117). In his work, *Uz Lujzinsku cestu* ([1935] 1993), Strohal provides detailed information on the service facilities along the Lujzijana Road, including their precise locations, and the information about profit generated from their operations, as they became well-established facilities. Even today, the local population speaks highly of their ancestors who were involved in this business:

My great-grandfather came to that land, he moved to the Lujzijana. My great-grandfather built an inn when the Lujzijana was built. It was like a lodging, for carriages. He came here, to earn money. He came because of the work. Back then, everyone was going to America to earn money. (...) He got rich. Business was going very well. It was the Lujzijana, the only road. (Eighty-year-old woman from Mrzla Vodica)

As a result of the road's importance, various new professions emerged. During the 19th century, wagons and stagecoaches were used for passenger transport, and sleighs were used in the winter. Many farmers began to engage in transport activities, with teamsters traveling individually or in caravans to transport goods such as beams, oars, firewood, charcoal, grain, and other products to Rijeka, Bakar, and other ports (Chylak 1981, 168–169). The increase in transport activity led to the establishment of numerous blacksmiths, wheelwrights, and other workshops for the production of various tools and accessories, as well as for the construction and repair of carts and sleighs, shoeing horses, and so on (Chylak 1981, 168–169). Along the roads, local residents provided transport services, transshipment of goods, worked in inns, tended to cattle, worked as road work-

⁷ Following the end of the French occupation and the re-establishment of Austrian rule, The Lujzijana Road Society was founded in Vienna in 1816. The society was granted a 50-year concession over the road, which allowed them to regulate and organize the work and maintenance of the road. They appointed a director in Vienna, a local supervisor in Karlovac, as well as clerks, engineers, and road workers who were responsible for regularly repairing the pavement, removing mud, raking gravel, cleaning culverts, and removing snow (Černicki and Forenbaher 2012, 30; M. Glad 2014, 41).

ers, and began to engage in entrepreneurship (Feletar 2016, 203). The Lujzijana Road brought modernization to the region, resulting in significant changes to both the social structure and physical appearance of the area. This road accelerated the stratification of the population, with a shift from primary sector occupations to secondary and tertiary ones. As a result, agricultural production began to cater more to the needs of travellers and livestock (Feletar 2016, 202–203). Moreover, faster and cheaper shipping of wood contributed significantly to the growth of woodcrafts and industry in Gorski Kotar (Feletar 2016, 204). These changes in the economic structure of the population led to increased individual incomes. The commercial and traffic functions of the Lujzijana Road also had a profound impact on the traditional agrarian landscape of the settlements along the road. Forests were cleared, partly to make way for new settlements and buildings, and partly for timber utilization. Settlements were also transformed by processes of urbanization (Feletar 2016, 183–184, 194–195, 202), as evidenced by the deagrarianization of the area, but urbanization was also manifested in the style of construction of buildings, with a transitional design that blended rural and urban elements (Gotthardi-Pavlovsky 1981, 368).

Roads are tangible evidence of technology and politics: they materialize the state, embody ambition, and transform the spaces they pass through (Harvey 2005, 131). Transport infrastructure construction allows states to reach even the most remote villages, manifesting and promoting their interests through infrastructure. Thus, the Lujzijana Road provided local and regional connectivity, linking the area with the Austro-Hungarian Monarchy, integrating the space. During one conversation, an interlocutor emphasized education as a result of the Lujzijana Road's construction and the influence of the Austro-Hungarian Monarchy on the local population:



Photo 2 School building in Mrzla Vodica, 1929 (private archive)

Austria-Hungary left great traces on the population itself, on their education, on their schooling, on their thinking in general, about life. My mom graduated from that Viennese cooking school along with a lot of other women from Mrzla Vodica. They organized some courses... It was all, more or less, related to Austria-Hungary... I mean, their culture. (Seventy-year-old woman from Mrzla Vodica)

Elementary school classes in Mrzla Vodica commenced in 1876 and a public school building (photo 2) with one classroom and an apartment for the teacher was constructed two years later (Jardas 2002, 20, 27, 37). By 1931, the school had enrolled 87 pupils (Jardas 2002, 37).

In the 1930s, there was a resurgence of growth in the village. A cooperative home was constructed in 1932, which housed a shop and social rooms. This development significantly improved the quality of life in the village, as it brought better access to food supply, and intensified social and cultural activities. As a result, several associations were founded, including the women's association (photo 3), mountaineers, skiers, fire brigade, and Mrzla Vodica was one of the few places that had brass music at that time (Jardas 2002, 28, 35, 38; Dragičević 2002, 47). The village hosted various events such as gatherings, plays, and handicraft exhibitions.

That was before the war, the 'Ženska grana' they called it. It was an association, women's association. These were peasant women, you see, in traditional garment. How many people were there... [with admiration and nostalgia]. There was an exhibition of handicrafts, there was dancing, there was a shop [showing a photograph]. (Eighty-year-old woman from Mrzla Vodica)



Photo 3 The Association Ženska grana in Mrzla Vodica, 1940 (N. Glad 1997)

Mrzla Vodica also had a promenade, which was a real rare feature for a small town. The well-maintained path was one and a half kilometres long, meandering through the forest and bordered by a protective wooden fence. Rest benches

were placed along the way, and there was even a designated space for holding parties at one extension of the path.

Estate of Banovina (*Banovinsko dobro*), was an integral part of the village, serving as a model estate for the improvement of agriculture, especially cattle breeding (Bertoša 2008). The estate was situated in a distinct and fenced-off area, with an administrative building that housed offices, meeting rooms, and a manager's apartment. The estate workers and their families resided in other buildings nearby. Several other buildings, including two barns for storing tools, equipment and materials, were also constructed as part of the estate. It provided locals with professional guidance on farming, cattle breeding, dairy farming, and beekeeping. A dairy was also established on the premises, where part of the milk was processed into cheese and butter while the remaining portion was shipped to Sušak.⁸

Despite the efficient operation of the railway in Gorski Kotar at that time, which facilitated easier, faster, and more convenient travel, the inns and boarding houses along the Lujzijana Road in Mrzla Vodica continued to be frequented by travellers. They provided rest for travellers, but also served as tourist destinations and as places for health-related purposes. Rural tourism attracted guests during the summer, which led to a total of 700 to 900 overnight stays in Mrzla Vodica between 1935 and 1940 (Jardas 2002, 38). One of the interlocutors shared their family's experience in the boarding house business, highlighting that Mrzla Vodica was not a small village, but rather a substantial one.

It was a big house, she had a boarding house, my grandmother had a boarding house. She was managing it. I have little memory of it. I was a kid, I was only 7 years old. There were 12 rooms. It was big! Most of the guests were from Sušak. Sušak was a Croatian city. So, the doctors would come. Whenever there was tuberculosis, people would come to Gorski Kotar for treatment, lung diseases, and so on. It was not a small village, it was a big one. And we always had inns here. Forest workers enjoyed a good drink, and, after all, this was Lujzijana. It was a beautiful village, full of people, it was lively [with nostalgia]. (Eighty-year-old woman from Mrzla Vodica)

The Lujzijana Road was a turning point for demographic and economic growth of many settlements along its path, including Mrzla Vodica. The quote "It brought a good life, it brought blacksmiths, and wheelwrights, and innkeepers, and... everything..." (Sixty-year-old woman from Lokve) illustrates the importance of the road to the local residents. Nowadays, the population of Gorski Kotar recognizes its significance and considers it a part of their cultural heritage: children learn about it in school, there are exhibitions and poems dedicated to it

⁸ Sušak is now part of the city of Rijeka in Croatia. In 1924, while Rijeka was annexed by Italy, Sušak remained a part of the Kingdom of Serbs, Croats, and Slovenes, that is, Kingdom of Yugoslavia. In 1948, the two cities were merged.

(Jarec 2019). Also, local population is putting in significant efforts to transform the road into a touristic cultural route in which they face various administrative and financial challenges (Jarec 2021, 181–195). It is also worth noting that people of Gorski Kotar often refer to the Lujzijana Road as a place, despite being aware that it is actually a road (as in the quote “He moved to Lujzijana” instead of “He moved to Mrzla Vodica”). A road is multilocal, so “Lujzijana” can refer to different places depending on the context. The Lujzijana Road is the most loved road and is deeply rooted in the identity of inhabitants of the region.

World War II in Mrzla Vodica and the Dam Project

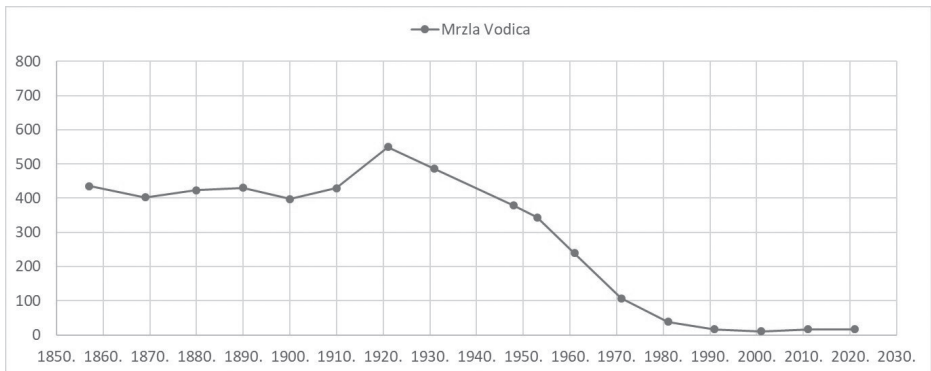
Further development of the village was interrupted by the World War II. In 1941, the Treaty of Rome was signed between the Italian government and the Independent State of Croatia (NDH)⁹ to determine the border between the two states. As a result, Mrzla Vodica was included in Italy, while Lokve was part of the NDH (Komadina 2015, 14; Magdić Komadina and Pleše 1999, 19). In Mrzla Vodica, the Italian language, culture, and legislation were enforced, and the settlement’s name was changed to Acquafredda. In contrast, the Ustasha movement was promoted in schools in the NDH area, and the local population resisted both regimes (Komadina 2015, 14; Mance 1981, 155). In 1941 and 1942 the Italian army was regularly searching houses in Mrzla Vodica for partisans and weapons, resulting in the burning of houses and sawmills, torture, killings, and imprisonment. Many locals fled to partisan camps, while others were interned in Italy and taken to Gonars, Treviso, and Padova concentration camps (Komadina 2015, 17–20). The school in Mrzla Vodica, consisting of four classes, was forced to close in 1941 (N. Glad 1997, 105).

After the end of the World War II, residents of Mrzla Vodica who had been detained, interned, or evicted, gradually returned. In addition to the loss of life, the impact of the World War II was also reflected in the migration of the local population and damage to material possessions. The majority of the village was left in ruins, and the reconstruction process was slow. By 1943, school classes had been established for the 1st and 2nd grades, and the old school building, which had been destroyed during the war, was reconstructed in 1946. At that time, there were 65 pupils in four grades (N. Glad 1997, 106). In 1949, the school was expanded to a six-year school and various new courses were introduced.

After the war, the entire region of Gorski Kotar experienced an increase in population due to three factors: reduced emigration as a result of increased deforestation, renewed industrial activity, and a post-war compensatory birth rate

⁹ The Independent State of Croatia (*Nezavisna Država Hrvatska, NDH*) was a World War II-era puppet state of Nazi Germany and Fascist Italy which was established in parts of occupied Kingdom of Yugoslavia in 1941.

(Lajić and Klempić Bogadi 2010, 193). Although the number of residents in the municipality of Lokve also fluctuated in line with regional trends, it relatively increased from 1948 to 1953, except for the village of Mrzla Vodica. The village of Mrzla Vodica is the only village in the municipality of Lokve that recorded a population decline in the mentioned period and has been continuously declining since then (graph 2). According to Holjević, Plišić, and Holjević (2000, 106), the increase in the number of residents in the central settlements of the municipality (Lokve, Homer, Sljeme, Sopač) is explained by the displacement of the area of Mrzla Vodica caused by the construction of the dam and reservoir-lake in 1950s.



Graph 2 Number of residents in Mrzla Vodica 1857–2021
(data taken from DZS 2001; 2011; 2021)

The above-described events were reflected in the destinies of people, but also in the physical features of the village as well as in the landscape. How deeply the local population experiences the events that took place in the World War II and during the construction of the dam, is perfectly illustrated by the following narration.

Then the Italians came, the Italians annexed Mrzla Vodica, that was according to Pavelić's¹⁰ agreement, and then it belonged to Italy. An Italian teacher was brought in, and if the children spoke Croatian, they would be imprisoned, sometimes they would even be imprisoned overnight. The people of Mrzla Vodica protested (...). They started to run away, they were imprisoning them, their only salvation was to join the partisans. They joined the partisans en masse! I mean, those people suffered a lot, and when they came back, then they built the lake, then they destroyed Mrzla Vodica even more! There are twenty people up there now, compared to almost a hundred just thirty years ago [with frustration]! (Eighty-year-old woman from Lokve)

¹⁰ Ante Pavelić was head of the Ustasha movement and the Independent State of Croatia (*Nezavisna Država Hrvatska, NDH*).

The construction of the dam began in 1952, and the project was completed in 1955 (photo 4). The dam and the bypass road was built by employees of the Hidroelektra company and youth, mostly from Croatia, other parts of Yugoslavia and abroad, gathered in Youth Work Actions (*Omladinske radne akcije, ORA*).¹¹ A total of 27,000 young people participated in the construction (Paver 1981, 180). German prisoners of war and inmates of the Stara Gradiška prison worked on the most difficult underground works (Krmptić 2015, 100; HEP 2012, 30).

The dam is 48 meters high and 276 meters long at 772 meters above sea level, and the volume of the reservoir-lake is approximately 35.3 million m³, the maximum depth is about 40 meters, and it covers an area of 2.24 km² (Sever et al. 2000, 80; Holjević, Plišić, and Holjević 2000, 105). The lake (photo 5) was named *Omladinsko* in honour of its builders (N. Glad 1997, 27–29), but after Croatia gained independence, the name was changed to *Lokvarsko*. Nevertheless, the name *Omladinsko* is still commonly used, particularly in the Gorski Kotar region.

The Lujzijana Road, spanning 5.5 km from Lokve to Mrzla Vodica, along with parts of the settlements Homer and Mrzla Vodica, and the village Srednji Jarak that lies between them, were submerged. Local population indicate that a total of sixty-nine houses, five sawmills, three inns, a chapel, a cake shop, a grocery store, a blacksmith's shop, and a barber shop were demolished, along with numerous pastures and arable fields, all of which were flooded. A construction of a bypass road, called the New Lujzijana Road began at the same time as the construction of the dam.

The displacement of people from the soon-to-be-flooded area was not always incident-free, even though compensation or a house in the suburbs of Rijeka were offered to those who had to move. One of the interlocutors in charge of demolishing structures in the area witnessed resistance from the locals.

There were sawmills and houses all along the road. (...) Four of us planned to tear down a sawmill, but this guy said he was going to kill us. He attacked us with an axe. (...) The people protested. But what they're going to do, it had to be demolished. They got the order to move. After that, they had the choice of getting a new house or money, depending on what they wanted. (Eighty-year-old man from Rijeka)

¹¹ Youth Work Actions (*Omladinske radne akcije – ORA*) were organized voluntary labour activities of young people in the Socialist Federal Republic of Yugoslavia. They were used to build public infrastructure such as roads, railways, and public buildings, as well as industrial infrastructure. Youth Work Actions were organized on the local, republic, and federal level by the Young Communist League of Yugoslavia (*Savez komunističke omladine Jugoslavije*) and participants were grouped into Youth Work Brigades (*Omladinske radne brigade*).



Photo 4 Construction of the dam (private archive)

On one hand, the population of the soon-to-be-flooded area was displaced, but on the other, a whole new temporary village was constructed in the surrounding area to accommodate youth brigades. In just three years, youth brigades exceeded the number of residents of Lokve by ten times on average. It's worth mentioning here the modernizing influence of the ORA organization, which was part of socialist modernization: since a large number of young people stayed in a small space for a short period of time, many sports events, meetings, and courses for illiterates were organized as part of the ORA. In 1952 alone, 2,070 illiterate and semi-literate participants learned to read and write (N. Glad 1997, 29).



Photo 5 The view from the dam towards Mrzla Vodica (author, 2020)

As the population emigrated, the number of children in the area decreased significantly (N. Glad 1997, 107). By 1961, the school had become the district school of Lokve, but due to the small number of pupils, it was closed down in 1972 (N. Glad 1997, 107–108). In the 1970s, there was a risk of the lake's water level rising, so the church and the school building were demolished in 1977.

The school in Mrzla Vodica was where we were standing (...). It was right by the Lujzijana. (...). The school

was demolished in '77. They closed the school even earlier because there were no children in the village. They put a monument to the anti-fascists in that place [photo 6]. And they demolished the school because it would be flooded. That's also why they demolished the church, and then they put a fisherman's house there [photo 7]. So if the water is going to reach the school or the church, then you can't put something else there [with frustration]! (Sixty-year-old woman from Lokve)

The local population is outraged by the demolition of the school, and especially of the church, in the settlement. It is considered that it was unnecessary since the lake's water level never rose as predicted and announced.

That building over there used to be a school, and that one, it was a church [showing a photograph]. They demolished everything, even the cooperative home where people used to gather. They got rid of all the village features, including the school, church, and cooperative home. Now, there are just a few houses left, and it's hard to believe that there used to be a whole village here. (...) It used to be a village, but now there aren't any village features left. (Eighty-year-old woman from Mrzla Vodica)

It is interesting to note how “they” are to blame for ruining the village. An answer to a question who are they, usually would be “politics”:

The church wasn't demolished just because it was supposed to be submerged. It was a political decision, it is the politics that destroys everything, not engineering. (Fifty-year-old woman from Mrzla Vodica)

The new church, which was constructed in 1978 (Dobriša 2002, 70), was relocated up the hill. However, locals often describe it as “terrible”, and some even refer to it, scoffingly, as a “firehouse” (photo 8).



Photo 6 Anti-fascist monument in the place of the school building in Mrzla Vodica, next to the restaurant (author, 2023)



Photo 7 Fisherman's house in the place of the church of St. Ana in Mrzla Vodica (author, 2023)

As mentioned previously, during the construction of the dam, a New Lujzijana Road was built to replace the original road. Portion of 5.5 kilometres of the Lujzijana road between Mrzla Vodica and Lokve was destroyed, and the new road, 21 kilometres long, was built allowing the Lujzijana Road through Gorski Kotar to be fully connected once again. At that time, mass tourism expanded along the coast, and transit tourism¹² emerged as the primary economic activity in Gorski Kotar, replacing the forestry and wood processing industry. This type of tourism developed in almost all settlements along the Lujzijana Road, leading to a diversification of tourist offerings, with restaurants generating the majority of income (Knežević and Grbac Žiković 2013, 119–120). As a result of the construction of the dam, lake, and the New Lujzijana Road, Mrzla Vodica was no longer positioned on the primary route connecting the inland to the seaside, which deprived the village of the new economic prospects and



Photo 8 New church of St. Ana in Mrzla Vodica (author, 2020)

¹² The term transit tourism refers to a set of relationships and phenomena that arise from the needs of travellers during travel through an area that for them is neither the source nor the destination of the trip (Horak, 2004).

led to its isolation. The remaining residents' quality of life was declining, and the lake was not utilized for tourism.

However, demographic data indicates a decline in the number of residents in the whole Gorski Kotar since the 1961 census (DZS 2001).¹³ This can be attributed to several factors. As mentioned, in the mid-20th century, there was a significant shift in the population of Gorski Kotar towards non-agricultural activities, however there was not an urban regional centre that could provide employment opportunities. In addition, growing influence of cities outside the region (Zagreb, Rijeka, and Karlovac) has gradually led to the depopulation of smaller settlements (Feletar 2016, 209). Furthermore, the construction of the A6 motorway that began in the second half of the 20th century led to the unburdening of traffic on the Lujzijana Road, which passes through the settlements. At the same time, it gradually destroyed transit tourism in Gorski Kotar and potentiated the emigration (Feletar 2016, 225; Lukić, Opačić, and Zupanc 2009).¹⁴

Present and Paradox of Infrastructure

The paradox of infrastructure on regional level is twofold. Two transport infrastructures played crucially different roles for the region: while the Lujzijana Road, dating from the beginning of 19th century, expedited immigration and flourishing of the region, another road, the A6 motorway, in combination with other factors, contributed to the underdevelopment of the region (Feletar 2016, 225; Lukić, Opačić, and Zupanc 2009). This is paradoxical meaning of roads: they connect by its definition, but also disconnect and alter socio-material orders (Dalakoglou 2017, 10; Dalakoglou and Harvey 2012), they connect globally and disconnect locally (Graham and Marvin 2001, 318). The paradox of infrastructure can also be observed in the fact that the region of Gorski Kotar stands for one of the most important transit corridors of Croatia, with above-average road connectivity of the central area of the region with coastal and continental Croatia.¹⁵ The central area of Gorski Kotar has excellent connections

¹³ Gorski Kotar reached its demographic peak in 1890 when it had 43,518 residents. In 1961, it had 38,088 residents, but major declines happened between 1971 and 1981 (in 1981 it was registered 31,692), and between 1991 and 2001 (in 2001 it was registered 26,120 residents). In 2011 census it was registered 23,011, and in 2021 only 18,954 residents (DZS 2001; 2011; 2021).

¹⁴ A6 motorway as the challenge, promise, and threat for Gorski Kotar are further analysed in Jarec 2021, 198–213; and symbolic meanings of the motorway and motorway travel in Jarec and Gulin Zrnić 2021.

¹⁵ Although there is an existing railway line through Gorski Kotar (Rijeka-Zagreb-border crossing with Hungary, 328.62 km), its technical characteristics no longer meet the requirements of modern transit and requires reconstruction.

with the northern Adriatic coast, nearby cities, the capital of Croatia and the continental part of Croatia. To the west, A6 motorway connects the central area of Gorski Kotar to the city of Rijeka on the Adriatic coast, and to the east to the Bosiljevo II junction (81.486 km (Croatian Roads, 2023)), providing access to Zagreb or Split. State road 3 (D3), an alternative to toll road which encompasses the New Lujzijana Road, also connects Gorski Kotar to the city of Rijeka in one direction, and border crossing with Hungary in the other (221.647 km (Croatian Roads, 2023)). Within Gorski Kotar, there is a road network encompassing state, district, local and unclassified roads. However, some parts of Gorski Kotar remain very isolated from the transit network, especially in winter when heavy snowfall occurs (Lajić 1999, 502).

The local roads in the region can be challenging, with winding, dangerous, unmaintained, and impassable routes due to the rugged relief and climate conditions. Informal conversations with residents of settlements in the northern part of Gorski Kotar revealed that it is actually easier and more cost-effective for them to travel to Ljubljana, Slovenia, than to Rijeka, despite the similar travel times. The local transport infrastructure in Gorski Kotar is not only problematic, but in some cases, non-existent, with certain settlements completely inaccessible by any road. This raises pressing issues about the possibilities and experiences of these communities that lack access to road networks. For them, life without a road presents numerous challenges, ranging from basic tasks such as buying groceries to accessing healthcare services. Residents describe themselves as “isolated from everything”, “far from civilization”, and express that having a road would save them (Hebar, 2020). It is evident that a road, which is often taken for granted by many, can mean lifeline for these communities.

Unlike some settlements, Mrzla Vodica is still accessible by roads after the construction of the dam and reservoir-lake. However, the lake has significantly disrupted the traffic system in the municipality of Lokve, leaving Mrzla Vodica isolated. The New Lujzijana Road opened for traffic in 1954, and 5.5 kilometres of the original Lujzijana Road was destroyed by the lake the following year. As a result, the distance from Mrzla Vodica and their administrative centre, Lokve, increased significantly. To cover the 6 kilometres distance between the two settlements, a resident of Mrzla Vodica now needs to travel more than 23 kilometres (map 3) using the New Lujzijana Road. Furthermore, the remaining part of the original Lujzijana road in Mrzla Vodica was only modernized more than 20 years later, with the section from Mrzla Vodica to Gornje Jelenje being asphalted in 1977 (Crnković et al. 1981, 217–218). This meant that Mrzla Vodica residents had the option to go to Lokve via the village of Crni Lug, taking a 26 kilometres route (map 3). It was only in mid-90s that the forest road to Homer was paved (N. Glad 1997, 55), providing another route to Lokve, although narrow, inadequate, and possibly dangerous route (Dobrića 2002, 68–69), spanning 10 kilometres (map 3). The new road network has brought changes in the

accessibility to Lokve, with distance becoming a significant obstacle (Adey et al. 2014, 9). Despite the fact that the journey to Rijeka is slightly longer (about 33 km and a little over half an hour's drive) compared to the municipal centre, Lokve, or the nearest town, Delnice, the residents find it acceptable and prefer to travel to the urban centre of Rijeka for their everyday activities and necessities. This new traffic flow organization has directed the local population towards an urban centre, Rijeka, while at the same time discouraging them from remaining in the region.

We are now all using this forest road as our connection to Lokve, which is actually a plain forest road managed by the regional forest department. Otherwise, we would have to take a route to Crni Lug, then to Delnice, and then finally to Lokve... Or we could go through Gornje Jelenje... Thankfully, this forest road has been paved as per the locals' request, and it has resolved our communication problem with Lokve, which is our municipality. We no longer have to take detours. However, for us, it is not as important to have a direct connection with Lokve as it is to have a connection with Rijeka. (Fifty-year-old woman from Mrzla Vodica)



Map 3. Three routes from Mrzla Vodica (A) to Lokve (C): by New Lujzijana Road via Gornje Jelenje (B); via Crni Lug (B); by forest road via Homer (B) (My Maps by Google, 2023)

Undoubtedly, the development of Mrzla Vodica has had its ups and downs, but it reached its lowest point in the 1980s. The severity of these changes is exemplified by the following statement:

It got to the point where they were considering relocating the remaining residents and removing Mrzla Vodica from the map. (...) The cancellation of the bus service further isolated the village. In the summer, the lake turned into a swamp. (...) There was no social force in the village that could lead any activity to save what was left of Mrzla Vodica. (Dobrila 2002, 65)

As depicted in the graph 2, the 1981 census recorded a population of only 38 residents in Mrzla Vodica (DZS 2001). In the 1991 census, the number of registered residents decreased to a mere 16, which further declined to 11 in the 2001 census (DZS 2001). In both the 2011 and 2021 census, the number of registered residents remained was 16 (DZS 2011; 2021). Some people retained their properties and use them as weekend getaways from the city, especially during summer.

The people of Mrzla Vodica have all moved out and all are living somewhere else. They come to Mrzla Vodica to see if the municipality is taking care of the public lighting, and to plant some flowers. (Sixty-year-old woman from Lokve)

The paradox of infrastructure is thus evident on a local level, as seen in the very definition of infrastructure itself. Infrastructural projects are meant to modernize, develop, and progress an area, but they do not always succeed in achieving their goals. In the case of Mrzla Vodica, both the Lujzijana Road and the dam/lake/New Lujzijana Road project were turning points. However, while the former brought positive impact, the latter caused disconnection, isolation, and contributed to underdevelopment. Both projects had significant impacts on physical and social characteristics of Mrzla Vodica. This same pattern is also evident in the definition of the road: while the Lujzijana Road connected Mrzla Vodica to other areas, the New Lujzijana Road, a consequence of the dam and lake project, actually disconnected it. Coming back to the A6 motorway, just like the New Lujzijana Road, it also serves as infrastructure that facilitate mobility for specific groups, while simultaneously hindering the mobility and increasing the isolation of others.

Conclusion

In order to comprehend the effects of infrastructure on social life, this study examines a significant infrastructure development within a rural setting, specifically concentrating on the village of Mrzla Vodica. By examining historical evidence and attitudes towards these impacts, along with considering the broader context of the Gorski Kotar region, the research investigates two crucial infrastructure components and their interplay with the village, and each other. The aim is to illuminate the complex relationship among infrastructure, landscape, and society.

Following the construction of the Lujzijana Road in 1805, Mrzla Vodica experienced a period of prosperity, characterized by an increase in population, the emergence of new occupations, and economic possibilities. The presence of the road facilitated a transition from primary sector jobs to secondary and tertiary sectors, fostering urbanization, education, vibrant social life, cultural activities, and initiating the development of tourism. However, World War II posed a significant

setback to the village's further progress. Once the war ended and the residents began the process of rebuilding, a new challenge emerged: the construction of the dam and reservoir-lake. This development led to a subsequent decline in the village. As a result, a section of the Lujzijana Road and certain areas of Mrzla Vodica had to be submerged, leading to the demolition of houses, businesses, and the displacement of residents. The emigration of people led to a decrease in the number of children, eventually resulting in the closure of the local school. After two decades of coexistence with the lake, the demolition of the school building and church signalled a turning point, signifying that Mrzla Vodica was no longer recognized as a proper village, both physically and symbolically. Despite the construction of a bypass road around the lake, the village lost its strategic position on the main route from continental Croatia to the seaside, thus depriving it of opportunities to partake in the emerging transit tourism industry.

Infrastructure is inherently linked to the concept of modernization, which encompasses various social, economic, political, and cultural processes. As the research shows, in combination with other modernizing factors both within and outside the region, infrastructure development can have contrasting effects, benefiting certain areas or social groups while simultaneously harming others. The construction of infrastructure in a particular area has a significant influence not only within that area but also in neighbouring regions, shaping the social structures. Thus, infrastructural development can have both positive and negative impacts to communities. The research demonstrates that considering infrastructure solely as a measure of development and progress can be misleading. Infrastructure can also give rise to trends that are unfavourable for communities. Furthermore, the research indicates the necessity of analysing the social changes that arise from infrastructure development to comprehend the production and construction of social space. Investigating the social implications of infrastructure building and exploring its complex relationships it entails are essential for comprehending the translocal processes involved in past, present, and future modernization projects.

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Infrastruktura i prostorna transformacija Mrzle Vodice u Hrvatskoj

Izgrađena infrastruktura poput cesta, željeznice, elektroenergetskih i drugih postrojenja i slično, su intervencije u prostoru koje mijenjaju njegov fizički izgled. Ako su smještene u ili prolaze kroz naselje, one se odražavaju i na kulturni te društveni život. Iako infrastrukturni projekti su dio modernizacijskih

projekata koji za cilj imaju unaprijediti život građana, oni predstavljaju proces koji se nerijetko odražava neravnomjerno na društvene skupine. Fokus ovog rada je upravo na procesima promjena koji su se u selu Mrzla Vodica (Gorski kotar, Hrvatska) dogodile nakon izgradnje ceste početkom 19. stoljeća te brane sredinom 20. stoljeća, pa sve do današnjih dana. Istraživanje je provedeno klasičnim etnografskim pristupom te studijskim istraživanjem literature. Cilj istraživanja je, na primjeru Mrzle Vodice, pokazati kako infrastruktura može donijeti prosperitet, ali i drastično intervenirati u prostor te za posljedicu imati nazadovanje, čak i nestanak jedne zajednice. Fokusiranjem na nejednakosti koje infrastrukturni razvoj proizvodi, ovo istraživanje pridonosi razumijevanju modernizacijskih procesa u ruralnom kraju.

Ključne riječi: infrastruktura, ceste, brana, modernizacija, nejednakost, Hrvatska, ruralno područje

L'infrastructure et la transformation spatiale de Mrzla Vodica en Croatie

L'infrastructure construite, comme les routes, le chemin de fer, les installations électroénergétiques et autres etc, sont des interventions dans l'espace qui changent son aspect physique. Si elles sont installées dans les agglomérations ou passent à travers, elles ont un impact aussi bien sur la vie culturelle que sur la vie sociale. Bien que les projets infrastructurels fassent partie des projets de modernisation qui ont pour l'objectif d'améliorer la vie des citoyens, ils représentent un processus qui assez souvent agit inégalement sur les groupes sociaux. Ce travail se concentre justement sur les processus de changements qui ont eu lieu dans le village de Mrzla Vodica (Gorski kotar, Croatie) après la construction d'une route au début du 19^e siècle, puis d'un barrage au milieu du 20^e siècle, puis jusqu'à nos jours. L'étude a adopté d'abord une approche ethnographique classique puis s'est poursuivie par une recherche dans la littérature de référence. L'objectif de cette recherche est de montrer, sur l'exemple de Mrzla Vodica, comment l'infrastructure peut apporter la prospérité, mais également intervenir drastiquement dans l'espace puis avoir pour conséquence la décadence voire la disparition d'une communauté. En se concentrant sur les inégalités que produit le développement de l'infrastructure, cette recherche contribue à la compréhension des processus de modernisation dans un secteur rural.

Mots clés: infrastructure de la route, barrage, modernisation, inégalité, Croatie, secteur rural

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