
Original Article

Problems and Promises of the Canal Istanbul. The Challenge of Megaprojects to Environmental Sustainability.

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Abstract: In 2011, the Canal Istanbul project, a massive artificial waterway intended to run parallel to the Bosphorus Strait from the Black Sea to the Marmara Sea, was proposed as a cutting-edge solution to maritime traffic and security in the Bosphorus Strait. The project, which involves underlying political, economic, and strategic goals, has been at the centre of several critiques due to its alleged scant consideration of the possible harms inflicted on the natural ecosystem of the area around Istanbul. The Northern territories where the Canal is supposed to be implemented are full of natural resources, including groundwater, forests, and agricultural lands. Consequently, the project raises significant concerns about the potential negative impacts on the environment and the local communities. Almost unanimously, observers affirm that the consequences not just of the Canal, but also of all the infrastructures that would arise together with it, from bridges to highways, as well as new urban hubs, would almost certainly lead to an *ecocide* and dismantle decades of policies aiming at preserving this invaluable green area, considered crucial for the inhabitants of the city. The article aims to disclose the main issues related to the plan, in parallel with the analysis of the objectives announced by the project's ideators, with a focus on the impacts on the environment in an area already characterised by several problems, from resource scarcity and the unpredictability of the territory, prone to earthquakes and floods.

Keywords: Canal Istanbul, Turkish Straits, megaproject, Montreux Convention, environmental sustainability, *ecocide*.

1. Introduction

Straits are crucial maritime lines of communication through which vital resources pass every day, sustaining the lives of millions of people. Energy, food, and all kinds of trade often get to our households after having crossed one or more of the approximately two hundred straits present in the geography of our planet. Interestingly, people tend to forget the importance of these *chokepoints* until something happens to them, leaving the whole world, or consistent parts of it, with a beating heart. In recent years, episodes such as the 2021 obstruction of the Suez Canal by the *Ever Given* container ship, as well as the increasingly frequent droughts affecting the Panama Canal, among others, have severely disrupted global economic activities, impacting millions across var-

ious countries and regions. Obviously, some straits are more vital to international trade than others. The English Channel, and especially its narrowest point near the Dover Strait, is the maritime artery with the busiest passage of trade ships on a global scale. Here, more than five hundred vessels cross daily, followed in order of passage volume by the Malacca Strait, the Hormuz Strait, the Panama Canal, and the Suez Canal (World Economic Forum, 2024).

The *Turkish Straits system*, a term used throughout the article to refer to the combination of the Dardanelles Strait, the Sea of Marmara, and the Bosphorus Strait, which connects the Aegean Sea to the Black Sea, holds a place of primary importance among the world's most crucial waterways. Throughout history, the rulers of these Straits have been well aware of their preciousness and have heavily invested in their control and protection. From the Eastern Roman Empire to the Ottoman Empire and the Turkish Republic, this stretch of sea has been a topic of invaluable economic, political, and security significance. Today, this dual passage affects not just the countries bordering the Black Sea and the Aegean Sea, but its correct functioning directly impacts three continents: Europe, Asia, and Africa (Kalinov, 2019). Oil and oil products, natural gas, grain, steel, and minerals (especially gold) are among the most common types of container ships crossing the Turkish Straits daily in both directions, together with the containers holding a wide range of goods, mainly destined to the landlocked countries of Eastern Europe (Reuters, 2016).

This introduction is necessary to understand the relevance of the Turkish Straits and, therefore, the long-debated *megaproject* proposing to "double" the Bosphorus Strait by creating a new, entirely artificial channel, known as *Canal Istanbul* (*Kanal İstanbul*, in Turkish). This highly discussed and criticised project directly involves several spheres of debate, including politics, the economy, and history, as well as sustainability and environmental-related issues. This article will address some of the most relevant issues surrounding the construction of the Canal Istanbul, while maintaining a focus on the ecological and environmental concerns for the greater Istanbul area as highlighted by several observers, scholars, and members of the scientific community.

2. The Canal Istanbul megaproject: more than “just” a canal

A *megaproject* can be defined as a large-scale project aimed at developing and transforming the way a specific area is conceived and used (Doğan & Stupar, 2017). Examples of mega projects include massive infrastructures, such as airports, bridges, dams, and railways, as well as sports venues, entertainment and shopping venues, and more. Despite their variety, all these megaprojects share some commonalities: they are costly, require a significant amount of resources for their implementation, and all would inherently and drastically transform the landscape and very nature of the area where they are implemented. Moreover, these projects often exceed the initially planned budget, timing, and resource allocation, sometimes delivering less than promised at the outset once the work is completed. Among these, *urban megaprojects*, exemplified by the Canal Istanbul, are massive and cutting-edge initiatives aimed at drastically and irreversibly transforming a city's environment from urban, geographical, economic, and socio-cultural perspectives (Mylonas & Xenidis, 2018).

Ideally, the purpose of megaprojects is to address issues affecting large communities of people. A growing population, with its increasing modern needs, may lead to the implementation of new large-scale infrastructures. At the same time, the deterioration of pre-existing infrastructures, in parallel with the emergence of new technologies, could offer new opportunities for development and change. But megaprojects also come with downsides, some of which have already been addressed earlier. Firstly, they inevitably require a massive

amount of resources for their planning, construction, functioning, and maintenance. Secondly, they usually cannot keep up with and meet all of the diverse and sometimes conflicting requests and expectations of all stakeholders involved, thus resulting in contradictory feelings and opinions among the public. Most importantly, these projects have a direct or indirect impact on the lives of millions of people, often with positive and sometimes negative consequences (Mylonas & Xenidis, 2018). Probably as a consequence of the high expectations, the massive deployment of resources, and the political reputation that these projects entail, sustainability concerns raised too often receive scant consideration (Doğan & Stupar, 2017), as well as the population's real needs.

In fact, megaprojects do not always constitute the most effective way to achieve a particular goal, and better investment solutions may exist. However, the rhetoric behind these megaprojects, their backing from political and entrepreneurial elites, and the heroic vision they project put other investment options on the sidelines (Mylonas & Xenidis, 2018), together with the environmental concerns. These bold constructions unquestionably come with economic aims, such as the attempt to stimulate a specific business environment. However, another paramount reason behind the efforts to implement these projects is linked to the prestige that comes with *city branding*. This strategy aims to increase visibility and recognition for a city on a global scale, as well as enhance its ability to compete with other urban entities, such as when bidding for major international events, or to boost international tourism in the country (Doğan & Stupar, 2017).

Interestingly, the idea of Canal Istanbul is not new, but dates back many centuries. There is evidence that discussions over the possible construction of an artificial waterway connecting the two seas were already underway in Roman times. More recently, in the sixteenth-century Ottoman Empire, a real project was designed to pursue this vision. Still, it was eventually abandoned due to the prevalence of other urgencies, especially growing regional tensions. Eventually, the intention to realise the Canal Istanbul project was announced by the then-Prime Minister Recep Tayyip Erdoğan in 2011, and its construction officially began in 2021 (Sönmez, n.d.). The project is actually part of a broader set of projects and goals, all of which are part of the *Vision 2023* agenda, a set of initiatives announced by the Turkish government between 2010 and 2011 and in the original plans to be achieved by the one-hundredth anniversary of the Turkish Republic, established by Mustafa Kemal Atatürk in 1923. Direct references to the history of the Ottoman Empire have also appeared among the attempts to sponsor and boost the acceptance of the plan among the Turkish electorate, with visual images portraying the creation of the Canal as "a new invasion of Istanbul", thus creating a direct link between Mehmet the Conqueror and the Turkish President who sustained the plan (Pehlivanli & Eslen-Ziya, 2024, p. 46).

In Istanbul, the push toward growth and the effort to attract investments are nothing new, as one of the largest cities in the world and the economic engine of Türkiye, the city and its inhabitants are used to this impulse toward development. However, due to its unique geographical location, rapidly growing population, and fragile surrounding ecosystem, several projects and initiatives have highlighted the importance of protecting the natural resources and green areas of the metropolis, primarily located in the North, thereby directing the city's growth towards the South (Enlil & Dinçer, 2022). However, this specific project directly encroaches on many of these environmental directives, proposing to profoundly change a vast area characterised by a very fragile and precious ecological equilibrium.

3. The Canal Istanbul in the intention of its promoters

According to the plan, the Canal Istanbul should be around 45 to 50 kilometres long, 150 metres wide, and 25 metres deep, allowing for the passage of vessels up to 300.000 dwt (deadweight tonnage) between the Black Sea and the Sea of Marmara. The overall cost is estimated to be between \$15 billion and \$20 billion, and the construction of the channel is expected to take approximately 6 years to complete (Daily Sabah, 2021).

From the perspective of those who designed and promoted the Canal Istanbul project, this innovation would contribute positively to the city by introducing several benefits. According to them, it would significantly contribute to security in the Bosphorus by reducing the number of vessels navigating in each of the two waterways, thereby decreasing the risk of accidents, especially those involving ships carrying oil and petrol products, hazardous materials and substances, also bringing a positive ecological outcome. Its backers also present Canal Istanbul as a crucial tool to address the transportation issues affecting the city. Its construction would automatically entail a consistent restructuring of transportation all around the channel, for instance, through integrated highway and railway transportation, and the construction of bridges connecting the newly generated artificial island to the mainland. The urban texture would also be necessarily restructured, as new settlements would likely lead to the development of more infrastructure, thus shifting urban density and growth (Dogan & Stupar, 2017).

A set of other benefits, according to the political, entrepreneurial, and military elite sustaining the plan, is related to the presence of the 1936 Montreux Convention, which precisely rules the passage through the Turkish Straits. Firstly, the implementation of the Canal Istanbul would enable the charging of fees, which would constitute a substantial income for the Turkish state. In contrast, the Montreux Convention stipulates that commercial ships can pass through the Bosphorus without paying any fees during times of peace (while military vessels could be subject to restrictions) (Işık, 2021). Despite being a "crazy project" as defined by the Turkish President himself in 2021 on the occasion of the beginning of the construction works (Bhattacharyya, 2021), the Canal Istanbul cannot overstep the international laws regulating maritime transits, including the Montreux Convention, from which Türkiye cannot withdraw. The backers of the plan, especially within the military ranks, stress that the implementation and usage of the Canal would not contravene the Montreux Convention, as it proposes an alternative rather than a replacement for the Bosphorus (an issue that brings maritime sovereignty, regional power politics and, above all, the tension between national ambitions and ecological necessities to the table of the topics touched upon by the Canal). Nevertheless, the legal status and regulation of the future new channel, if implemented to the fullest, are yet to be disclosed (Sönmez, n.d.).

Even if Canal Istanbul is not the same as the Bosphorus Strait, the Montreux Convention would extend its rule over the new channel as well, for the only way Turkish authorities could avoid the influence of this international treaty was if the new channel were connecting the Black Sea and the Aegean Sea directly, without passing through the Sea of Marmara (Kalinov, 2019). Clearly, the 1936 Convention may be subject to change, especially considering Türkiye's growing global influence, particularly in political, diplomatic, and military spheres. However, as of today, these rules would also apply to Canal Istanbul. In fact, although primarily presented as a necessary solution to decreasing maritime traffic and increasing security in the Bosphorus Strait, the Canal Istanbul project has underlying geopolitical objectives, and rhetoric enacted by the political and entrepreneurial elite to sustain it is rooted in a *global city* discourse, portraying the city of Istanbul as a future-oriented megalopolis able to compete with other cosmopolitan cities in the arena of urban power and prestige (Doğan &

Stupar, 2017). However, multiple studies assert that its realisation would inevitably pose serious threats to water governance in Istanbul, and exacerbate those factors linked to the ecological fragility and climatic vulnerability of the area, thus posing serious threats at both the local and regional levels (Sönmez, n.d.).

4. A comprehensive analysis of the primary water-related risks associated with the Canal Istanbul project

Often, the main risks associated with megaprojects are of a financial nature. National funds are insufficient to cover all of the *mega-costs* these projects entail, and foreign investments typically play a central role in financing them. However, relying too heavily on foreign investments is never advisable, especially for a place like Türkiye, for a conduct of this kind would inevitably put more pressure on the already very complicated economic situation of the country, with consistently increasing inflation and devaluation of the Turkish lira among the most urgent issues to address. Countries like China and the Gulf monarchies, especially Qatar, one of Ankara's closest allies in the region, have repeatedly expressed their willingness to invest in the Canal Istanbul project's implementation, a move that, at the same time, could boost these countries' direct influence over Türkiye in the long term (Eldem, 2021).

When looking at the domestic scenario in Türkiye, it should be highlighted that some of the highest-level banks in the country have adopted a *Sustainable Banking Strategic Action Plan*, a set of measures and guidelines aiming at encouraging environmental risk assessment and green finance in high-level financial institutions to promote the zero-emissions transition and commit to international sustainability standards (Tyson & Seçkin, 2024). Given the high environmental impact risks associated with the Canal Istanbul project, this pact represents a barrier to domestic financial entities' contributions to its funding (Işık, 2021).

Moreover, the approval of the Environmental Impact Assessment (EIA), a tool for evaluating the environmental effects of public and private projects, is a legal requirement in Türkiye, particularly for large-scale projects (Doğan & Stupar, 2017). Several sustainability and environment-related issues were raised not just for the Canal Istanbul, but also for other megaprojects proclaimed by the Turkish establishment over the past decade or more, such as the Third Bosphorus Bridge, the world's longest suspended bridge, constructed North of Istanbul, or the Third Airport, announced in 2012 and designed to become the biggest airport in the world. In particular, several members of the scientific community, representatives of NGOs, and other professionals have severely criticised the project, as it directly jeopardises the green areas and water basins located in the North of Istanbul, which are of invaluable importance for multiple reasons (Enlil & Dinçer, 2022); a conduct that would inevitably further inflame the ongoing *conflict* between the *economy* and *ecology*.

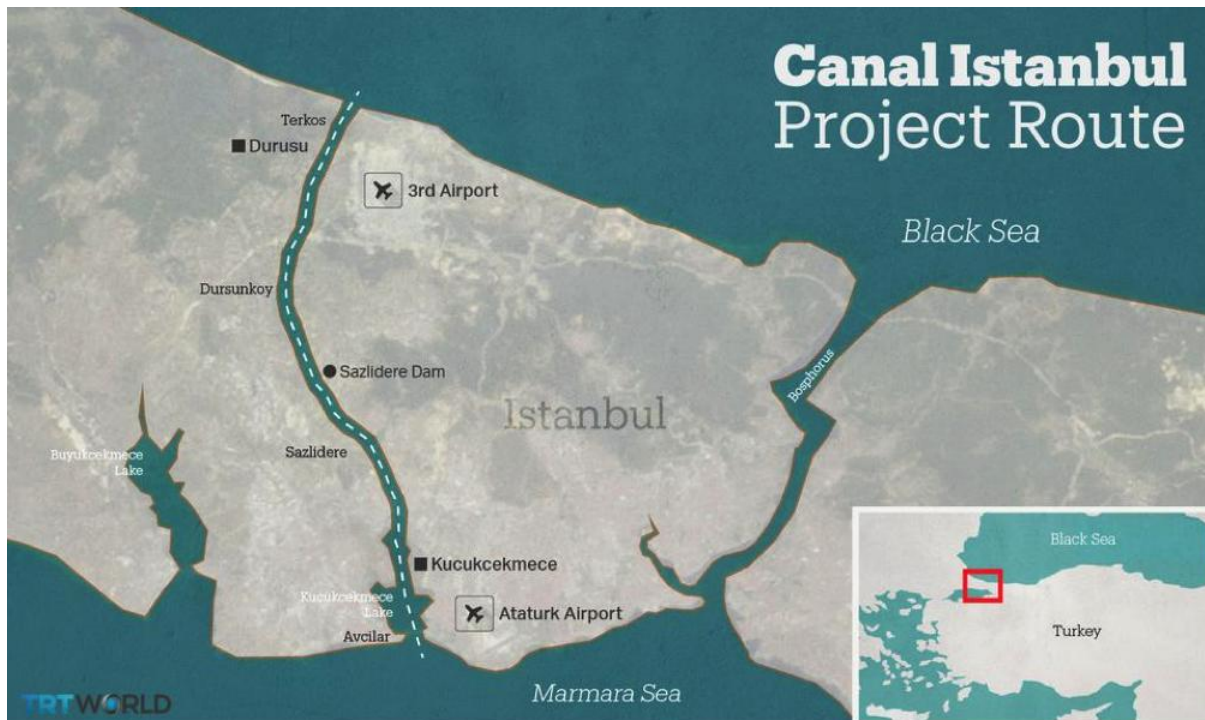


Fig. 1 The route of the Canal Istanbul megaproject (Atmaca, 2020).

The route envisioned for the Canal Istanbul by its creators, in fact, would cross a highly vulnerable strip of land characterised by multiple sensitive areas, including groundwater resources, agricultural lands, and wetlands (Sönmez, n.d.). Overall, it is a widely held opinion that the project poses inherent dangers to the entire area's ecosystem and, consequently, to the inhabitants of Istanbul from the Black Sea to the Marmara region. Among the main negative impacts, three key downsides can be identified.

Firstly, the construction of the new Canal would harm the flora and fauna of the Black Sea and the Sea of Marmara due to the exchange of water and the alteration of local streams and currents (Kalinov, 2019). In particular, inverting the hydrologic balancing occurring between the warm, salty waters coming from the Eastern Mediterranean, on the one hand, and the cold, freshwater of the Sea of Marmara, would trigger an "irreversible environmental disaster" (Doğan & Stupar, 2017; Kocabaş, 2025) with permanent consequences on marine life as well as everyday life in the metropolis. Secondly, the change occurring in the flow of freshwater rivers and underground water streams may lead to increased risks for Istanbul's water supply and sanitation systems. Water security is already a pressing concern for the residents of the greater Istanbul metropolitan area. While the population keeps on growing, water reserves are in danger due to increasingly frequent extreme weather events, droughts, floods, and heatwaves, as well as uncontrolled urbanisation and the consequent rising water supply demand (İlhan, 2021). Another two crucial water supplies to the inhabitants of Istanbul, dating back to Roman times, namely the Terkos and Sazlidere lakes, would likely undergo significant changes with the implementation of the Canal, with unpredictable consequences for the water supply to Istanbulites.

Therefore, utmost attention is required, given the high probability that the water situation may worsen further in the years and decades to come. Water security has been a pressing issue on the table of policymakers since the very birth of the Republic. Several projects and initiatives, both at the domestic and multilateral levels, have been undertaken to date in an effort to ensure good water governance for the entire country. A goal that has

only become more relevant and urgent in the twenty-first century (Kıbaroğlu, 2022). In light of all this, even more attention is necessary when implementing a project that risks deteriorating an already complicated situation. Finally, the third significant negative impact that the implementation of Canal Istanbul would have on the environment is linked to the fact that all species living eastward of the Canal would remain *trapped* on the artificial island that would be created following the construction of the channel, delineated on the other side by the Bosphorus. Some of them would be dangerously cut off from their natural habitats (Kalinov, 2019).

Since environmental problems, more than others, are never limited to the area where they first occur, but rather tend to influence other communities and countries through a chain effect, the criticisms that the implementation of the Canal could raise, not just domestically, but also internationally, are a factor not to underestimate. The Canal Istanbul project directly encroaches on the principles outlined in the *1:100,000 scale Istanbul Metropolitan Plan*, approved between 2006 and 2009. This plan, which aims to guide the city's long-term development and protect its environment and ecosystem, emphasises the importance of avoiding development in the northern territories at all costs. On the contrary, the goal is to divide the city into smaller sub-centres, with a specific web of connections and facilities, with the overall objective of setting a healthy and functional urban organism. Nevertheless, Canal Istanbul and the other megaprojects mentioned above were announced just a few years after the approval of this plan's principles (Canal Istanbul being the most disruptive among these from an environmental perspective) (Enlil & Dinçer, 2022). Some observers affirm that by ignoring all of these guidelines whose aims are to preserve the ecological situation of Istanbul, the project would inevitably lead to an *ecocide*, defined as "unlawful or wanton acts committed with knowledge that there is a substantial likelihood of severe and either widespread or long-term damage to the environment being caused by those acts" (World Economic Forum, 2021). In other words, such conduct would directly and simultaneously threaten biodiversity on Earth and under the Sea, food and water security, and environmental protection, especially in relation to the emergence of prolonged and more intense heat islands (Sönmez, n.d.).

5. Other issues related to the implementation of the Canal Istanbul

In an area already characterised by landslides, several active fault lines, and earthquakes, the irreversible changes enacted in the region by creating an artificial island surrounded by two water streams, with all the sustained deforestation that this would involve, would most certainly generate an even more fragile and unpredictable situation for the numerous (and growing) population of the larger Istanbul metropolitan area. In fact, by changing the territory so drastically, the risks of enhanced catastrophic events, especially floods (Kocabaş, 2025), increase in the event of a strong earthquake (Sönmez, n.d.). In his work, Kocabaş (2025) focuses on the districts of Çatalca and Beykoz, two peripheral areas in the North-West (European side) and North-East (Anatolian side) of Istanbul, characterised by a considerable amount of water resources, impermeable or semi-permeable soils, and therefore subject to a high risk of floods. The author's study focuses on demonstrating how the implementation of the channel would almost certainly increase the risks of flooding in the area North of Istanbul, which is already extremely dangerous from this perspective. In these areas, the implementation of previous megaprojects, particularly the Third Bridge mentioned above, also known as the Yavuz Selim Sultan Bridge, has already exacerbated an already complex scenario.

Another factor of worry is that related to the carbon footprint that the implementation of the Canal would produce, with estimates ranging from 1.3 million tonnes of CO² per year for each year of construction,

plus around 200.000 tonnes to be generated during the Canal's operation, to which will be added those stemming from the urban development that will grow in parallel with it (including population relocation and the increasing energy demand that will inevitably rise), thus putting a considerable pressure on the climate-related commitments embarked on by Turkey (Sönmez, n.d.). Moreover, another significant issue is related to property rights. In a climate of aggressive urban development, the rapid expropriation and destruction of forestlands and farmlands to accommodate large-scale and invasive projects significantly impacts many people and decisively prioritises private interests over public interest. The combination of increasingly centralised decision-making and lack of transparency, also resulting in poor public awareness, undermines public participation in the planning and implementation of megaprojects in general, and this specific case makes no exception (Dogan & Stupar, 2017).

6. Conclusion: A pre-announced catastrophe?

In light of the above, a crucial question arises: Could building the Canal Istanbul yield any positive outcomes? As some observers note, a real need for implementing the Canal can hardly be demonstrated through data. Shipping companies, on their part, do not seem to be demanding the construction of a new waterway, especially considering that, for decades now, significant accidents have not occurred, largely thanks to the traffic management improvements enacted over the years to enhance security in the Bosphorus Strait (Eldem, 2021). Therefore, a new water channel is probably not the *best* way to achieve the goals announced by the plan's backers, as ad-hoc investments in maritime security could improve the situation faster and with fewer resources (Işık, 2021). Moreover, building the new Canal might not bring any significant improvement to navigation in the Bosphorus Strait either. The narrow structure of the channels, which would also be a characteristic of the new channel, together with adverse weather conditions (especially wind, fog, and water currents), are among the main factors determining delays and slow navigation in the Bosphorus. However, likely, the same factors would also affect passage through the Canal Istanbul (Işık, 2021).

In 2011, the Turkish President stated that the Canal would have been completed in time for the 100th anniversary of the Republic of Turkey, which occurred in 2023. However, the evident issues related to the plan have consistently delayed the commencement of its implementation. Construction works preceding the actual building of the Canal began in 2021, and some communities are already experiencing the negative consequences firsthand. This outcome is more evident in the case of small local communities living in the northern green areas all around the more urbanised Istanbul. Their activities, including farming and livestock breeding, are jeopardised by a system that excludes and relegates them to the margins (Rondinella, RSI, 2025), and many of the families that have been living on these economic activities for generations are already paying the price of the state's land appropriation to build the megaproject (France24 English, 2025). While Istanbul's large-scale projects promise economic visibility and competitiveness on an international scale, according to the *global city* rhetoric mentioned above, their expansion raises several urgent concerns. The city's growth towards the northern green and resourceful areas risks intensifying pressures on the already unstable natural ecosystem of the greater Istanbul metropolitan area. Unless appropriately addressed, these issues may deteriorate the long-term appeal of Istanbul's neoliberal development model, especially as other global cities worldwide increasingly adopt sustainability and green policies as strategic priorities.

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