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Note di ricerca

From Water to Desert: Evolution of Transportation Systems in The Aral Sea Area

Dall'acqua al deserto: evoluzione dei sistemi di trasporto nell'area del Mare d'Aral

Giuliano Luongo[1,2]

[1] *Università Telematica Pegaso, Italia*
[2] *Università Mercatorum, Italia*
E-mail: giuliano.luongo@unipegaso.it; giuliano.luongo@unimercatorum.it

Abstract. The Aral Sea evaporation is among the most relevant ecological disasters of the XX century. The Aral Sea was the fourth largest inland water basin (Meini 1994; Micklin 2008) at the early 1900s, while today stands as one of the most toxic desertic areas globally due to the uncontrolled increase in salinity, as well as pollution from civilian and military waste discharge. Based on the contributions on the society-environment linkages (as seen in White, 2013), this paper will discuss the evolution and development of transportation systems in the transformed environment of the two basins – North and South – of the Aral Sea. The first section will focus on the needs for water transportation over the Aral Sea from the early 1900 and their development linked to the socio-economic development of the area. The second part will cover the contemporary (2010-onwards) needs for transportation of the current developmental needs of populations living around the former basin's area.

Keywords: Aral Sea, transport, logistics.

Riassunto. L'evaporazione del Mare d'Aral è uno dei disastri ecologici più rilevanti del XX secolo. All'inizio del Novecento il Mare d'Aral era il quarto più grande bacino idrico interno (Meini 1994; Micklin 2008), mentre oggi è una delle aree desertiche più tossiche a livello globale, a causa dell'aumento incontrollato della salinità e dell'inquinamento dovuto allo scarico di rifiuti civili e militari. Sulla base dei contributi sui legami tra società e ambiente (come visto in White, 2013), questo articolo discuterà l'evoluzione e lo sviluppo dei sistemi di trasporto nell'ambiente trasformato dei due bacini - nord e sud - del Mare d'Aral. La prima sezione si concentrerà sulle esigenze di trasporto via acqua sul Mare d'Aral a partire dai primi anni del 1900 e sul loro sviluppo legato allo sviluppo socioeconomico dell'area. La seconda parte tratterà le esigenze di trasporto contemporanee (dal 2010 in poi), legate alle attuali necessità di sviluppo delle popolazioni che vivono nell'area dell'ex bacino.

Parole chiave: Mare d'Aral, trasporto, logistica.

1. Background and scope of research

The Aral crisis[1] is currently still considered as one of the worst human-led environmental crises of recent times (see, among others, Meini 1994; Micklin 1998; 2008). The main reasons behind the exsiccation of the wet area are to be found on the scarcely sustainable development strategy of exploiting the two main tributaries – namely, Amu Darya and Sir Darya – to irrigate the once blooming cotton industry in the territories of the bordering former SSRs (see Tarr and Trushin, 2004). State-led development heavily neglected the conditions of the Aral wet area, seen as doomed in any case due to the natural process of water evaporation. The Aral area's environmental health, even if it was one of the main sources of fisheries of Central Asia and southern USSR, was completely ditched in favor of the mentioned industry, perceived as far more lucrative – in the short run, at least[2]. The Aral wet area was also an obvious "maritime connector" among the bordering SSRs, with maritime transportation and tourism being fairly developed as long as the area survived (Fig. 1).

Post-soviet administrations tried at different levels of engagement to recover the area, even with the support of international organizations, with widely varying results[3]. Currently, only the northern part of the former sea formally survives, as the Northern Basin or "Little Aral" in territory of Kazakhstan; while the main basin, mainly spanning in the territory of Uzbekistan, lies in far worse conditions, split in two basins – Eastern and Western – only with the latter showing vague signs of cyclical recovery. The sadly former main basin has developed in a desertic area known as Aralkum (lit., Aral desert).

The very nature of the progressive disappearance of the water surface leads us to the main topic that we will try to give an overview on, namely the discussion on how the transportation system in the area *changed*, more than developed.

It has been estimated[4] that, at the beginning of the twentieth century, waterways among the Aral Sea and the Amu Darya River accounted for a total of 887km in 1924; this figure sharply rose until the last decade of the USSR, peaking at 2800km in 1980. The decline in water levels literally deleted the sea routes from the map, leaving only the river ones surviving (Fig. 2).

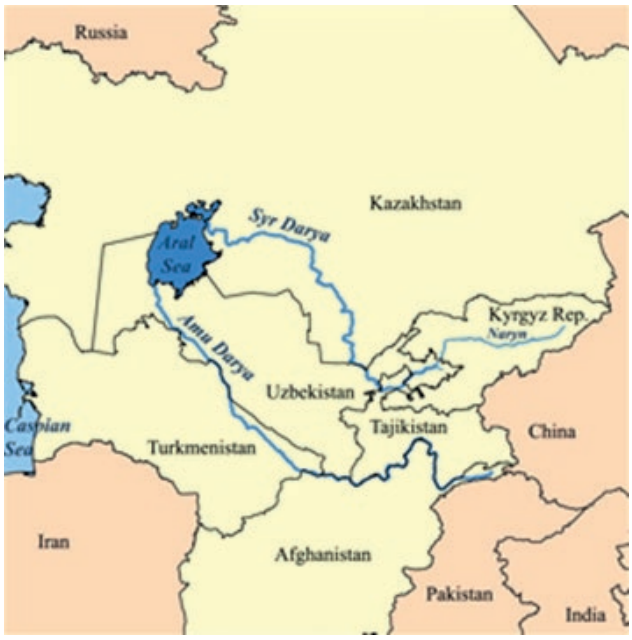

Figure 1. The Aral in the early 1960s. Open-source map distributed under Creative Commons License by Karl Musser, 2005.

Currently, there are no recorded maritime transport activities after the 1990s[5]. Additionally, the once thriving fishing sector disappeared with the environment where it was established. The few remaining wet areas in the main basin are not fit for the survival of sea fauna: the Southern Basin is currently completely devoid of life, while the Northern Basin enjoys a relatively brighter fate, with a few species reintroduced in the mid-00s and still trying to increase their numbers[6].

The main fishing port of the area was the city of Aral (also spelled as Aralsk), in Kazakh territory. The city is currently 15km far from the Northern Basin, still an improvement after the record registered distance of 100km before the heavier regeneration interventions of 2005. A similar fate occurred to the town of Moynaq (also spelled as Muynak), located in the autonomous region of Karakalpakstan in Uzbekistan: the biggest

[1] In the article we will use the expression "Aral crisis" instead of "Aral Sea crisis" in order to avoid confusion since that the – mainly former – wet area has been both referred to as Aral Sea or Aral Lake, and more recently as Aral Desert.

[2] See, among others, Xenarios (2013).

[3] As known, Kazakh commitment in preservation has been far deeper and more successful, while Uzbek commitment, after an initial stint, geared towards different directions aiming to work towards a different kind of further exploitation of the natural resources of the area. International organizations are still engaged in supporting the recovery of the area, with dedicated international programmes backed by the UN, and the EU.

[4] See *Другие Виды Транспорта*, 07 Dec. 2016, in Geografiya.uz, http://geografiya.uz/socialno-ekonomicheskaya-geografiya-uzbekistana/10073-drugie-vidy-transporta.html.

[5] See, among others, De Cordier (2019).

[6] The Aral area enjoyed one of the highest levels of biodiversity. Currently, many local species have gone extinct. In the Northern Basin, more than 20 freshwater species have returned due to the drop in salinity and thanks to some human-led species reintroduction.

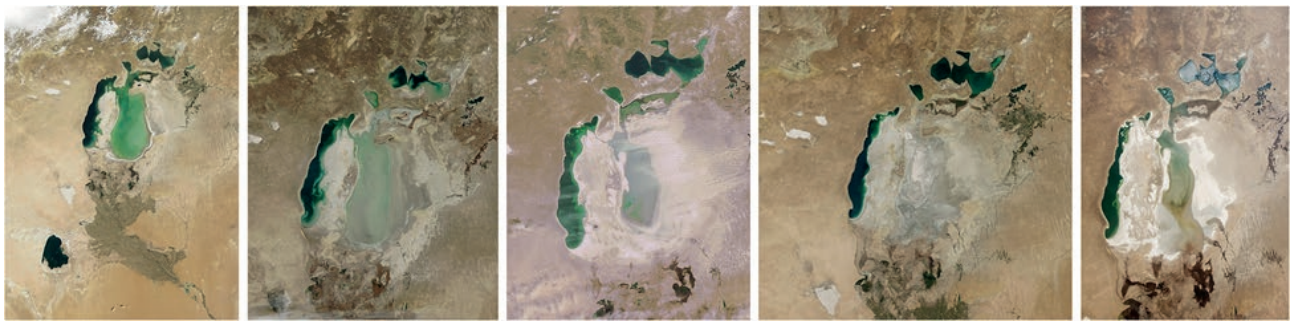

Figure 2. The progressive desiccation of the Aral area, left to right, in 2001, 2003, 2008, and 2014. Open-source map distributed under Creative Commons License by Expedition 55 Crew (satellite photos).

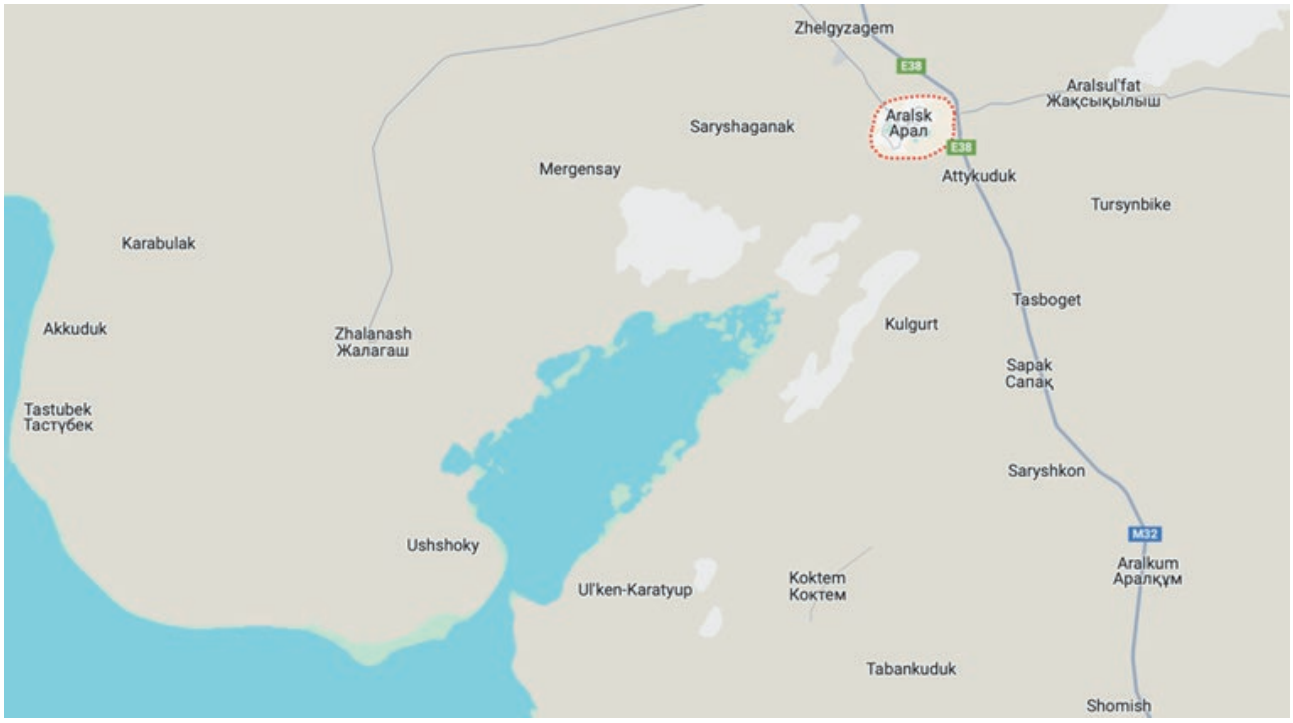

Figure 3. The position of the town of Aralsk in relation with the current state of the wet area and route M32-E38. The image shows the lack of paved/formal roads in the former wet area. Source: Google Maps, author's elaboration.

fishing and port town of the Uzbek SSR is now a sort of "disaster tourism" location, circa 70km afar from the closest point of the Southern Basin shore (Fig. 3).

2. Aral, (formerly) coast-to-coast

The mere fact of crossing from one coast to another a maritime area which does not exist anymore may look like an oxymoron itself, but the issue keeps being real – has it been thought a way to go across an area which basically has no roads or other ways of connecting two opposite points on the map? Fundamentally, the main connector of settlements on the former shores of the Aral area was, unsuspectingly, the Sea itself. Its disappearance left a literal "blank spot" on the Central Asian map.

Planning to give a more focused overview, we will split the discussion between how transport and related logistics are dealt with about the North and South Aral Basins. Interestingly, travel routes tend to be relatively difficult to plan because of the complexity about how to find them. Even main institutional sites for

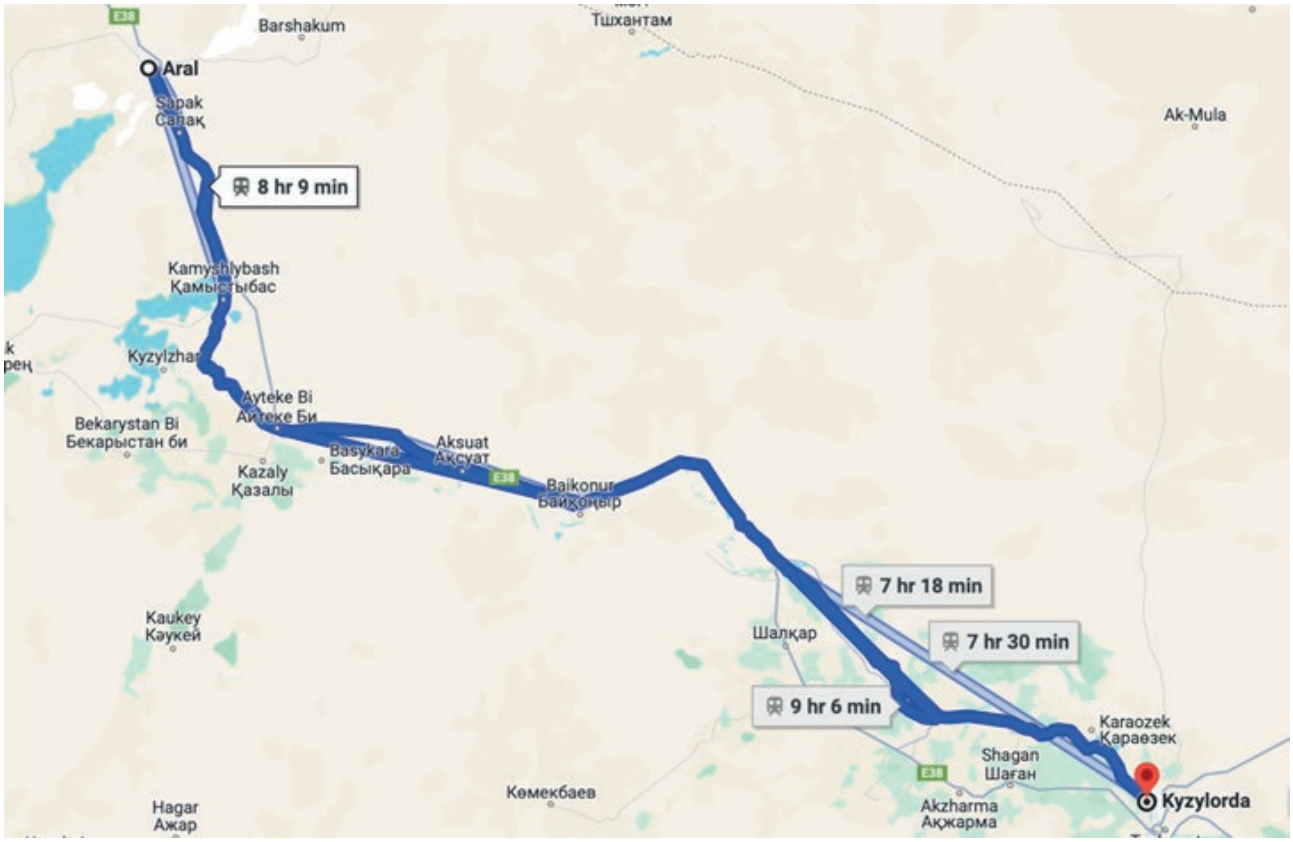

Figure 4. The railroad connections from Kyzylorda to Aralsk. The highway connection (M32-E38) mostly follows on the dark blue track. Source: Google Maps, author's elaboration.

the promotion of local tourism in Kazakhstan tend to discourage such routes, tending to hide them in favor of other ones. Interestingly, even official websites for public transportation tend to be relatively hidden, as in the case of the Kazakh National Railways Company official website[7].

The North Basin – being the only one being an *actual* basin, taking everything into account – presents a more manageable scenario of his former wider "brother".

While air transportation is currently the faster way to travel through Kazakhstan due to chronic lack of roads and the backwardness of the peripheric railway system. Interestingly, directly flights from the biggest cities in the country tend to overshoot their trajectories, connecting them to the town of Atyrau, on the Caspian Sea.

[7] The Kazakh National Railway Company's (Kazakhstan Temir Zholy) website, URL http://www.railways.kz/, for example, is forbidden to the public connecting from outside the country. This information has been verified via VPN (ExpressVPN) to simulate a connection from inside the country on April 4, 2024.

The focal logistical point of the area becomes, then, the town of Kyzylorda, which shares the name with the eponymous *oblys* (region) of which it is the capital. The town held a notable importance during the core years of the ancient Silk Road, while currently it is considered more of a peripheral town. Kyzylorda is connected to the rest of the country with a relatively large airport, capable of managing smaller local flights to the town in the westernmost part of the country. Lying on the Syr Darya river, it still enjoys the opportunities given by the surviving water transportation opportunities mentioned in the earlier section (Fig. 4). The town enjoyed relative development – thus, the need to build an airport – thanks to the exploitation of the oilfields located in the Turgay Basin. The most interesting point for our destination, however, is the railway station. Such station acts as a railway hub to connect travelers to the smaller destination in the mid-western part of the country, with particular attention to the once thriving towns of the former Aral wet area. In such way, the closest town can be reached via one of three lines of trains: two local

ones Almaty-Aqtobe and the Almaty-Mangistau, and the international line connecting Bishkek to Samara[8]. The average transit time to Aralsk, for example, is between seven and eight hours and half (depending on the line and potential delays) to cover slightly less than 450km[9].

Road connections from Kyzylorda to Aralsk are slightly quicker than trains, with an optimistic estimate set between five and six hours. The main artery is the M32 highway, the so-called "Aral Highway" and one of the main connecting routes of the two extreme sides of Kazakhstan[10]. The highway, while having been improved in recent years, still presents many non-paved areas; additionally, servicing across the highway is very often insufficient, lacking a well-distributed quantity of gas stations or similar rest areas[11]. The town of Aralsk lies in middle of the route.

Further connections to the actual shore are managed via local road transport companies and travel agencies. Quality is obviously very variable, and not necessarily proportional to money spent.

Trying to further deepen the penetration in the former wet area becomes possible only via car, on more difficult routes: paved roads end at Zhalanash[12], in the middle of one of the now-desiccated areas of the lake. Roads to the current "seaside" towns are non-paved and can be crossed only via 4WD/AWD vehicles.

As can be easily seen, we have mainly considered how to approach the Aral area from the Eastern part of the country: from its Western side, namely from the Aqtobe *oblys*, roads are completely absent and there are no hub cities as Aralsk or the farther Kyzylorda, rendering penetration of the area from very difficult to nigh impossible.

A point of interest of the Aral area is the Barsakelmes[13] nature reserve. This area lies in the center of the North Basin and consists of a former island, now a plateau which expanded by the desiccation of the surrounding area. It gained the nature reserve status in 1939 under Soviet government before the current disaster; its name translates from local language as the "place of no return", to underline the complete unfriendliness and unforgiveness of the resident fauna and flora. The reserve hosts many rare species and has become notorious for his isolation, accounting for 32hrs circa of travel from the nearest hub to be reached. Barsakelmes is the tip of the iceberg of the keyword describing the area, namely "isolation".

The Southern Basin presents an even more desolated scenario. The main focal hub to reach the shores of Aral's South Basin is currently the town of Nukus, in Uzbekistan. Nukus is 200km circa far from the southernmost shore of the Eastern basin of North Aral. The town has an airport and is connected with direct flights from Tashkent, Almaty, and Moscow. The town is connected the country's capital with the A-380 route, with a one-way trip accounting for circa 15hrs of travel; direct train connections to the town are almost non-existent, leaving flights as the only viable way to reach it.

From Nukus, road transport is the only way to get close to the Aral shores. The deepest roads reach the cited town of Moynaq, as well as the town of Uchsay, 11km northwest from the earlier. The approach to the shores can only be possible via 4WD/AWD vehicles and is usually run by dedicated travel companies for very ingenious tourists. The surviving remains of the Amu Darya River offer another possibility to reach the Aral, but its weather-dependent conditions as well as recent infrastructural developments[14] do not make it a viable or consistent solution if compared to land transport.

3. A dry ensemble of conclusive remarks

The awful wordplay opening the closing section of this short contribution aims to set the tone for a consistently downbeat series of closing remarks.

The main challenge to logistics in the former Aral wet area lies at the roots of the main *logical* need of logistics itself: the *need* for connecting spots on a map, be it for whatever reason justifying the maintenance of a road or railroad. To the point of being redundant, it is important to recall the seven principles of logistics[15]: Getting the Right product, in the Right quantity, in the Right condition, at the Right place, at the Right time, to the Right customer, at the Right price. Putting aside the more strictly product-focused considerations, not relevant to our cur-

[8] This ambitious route connects the capital of Kirgizstan, Bishkek, to the Russian port town of Samara, on the Volga River. Differently from the other two lines, this is primarily operated by the Kirgiz National Railway Company (Kirgiz Temir Zholy).

[9] Information cross-checked via the Kazakh Temir Zholy website and Google Maps. Last checked: April 4, 2024.

[10] Specifically, it connects the northernmost town of Uralsk to the capital of the region of South Kazakhstan, Shymkent. It is more than 2000km long and it forms the Kazakh branch of the European Highway E38.

[11] As reported by the IWEP Astana.

[12] Zhalanash is one of the small former seaside towns. At the latest census (2009), it counted slightly less than 700 inhabitants. See *Итоги Национальной переписи населения Республики Казахстан 2009 года*, from the Kazakh National Statistical Agency (Агентство Республики Казахстан по статистике). Available online (archived)

[13] Also spelled as Barsa-Kelmes.

[14] The river's survival is at stake after the start of a Chinese-backed Afghan infrastructural project based on the idea of channeling the river's water in Afghanistan in order to boost agriculture; this, while China expect to exploit the "future former" river are for oil exploitation.

[15] See, among others, Gleissner and Femerling (2013).

rent discussion, we have to focus on the importance of the logic behind the need for transportation of people and goods: a viable cost/efficiency relationship. In other words, spending resources to connect a series of points needs a return, be it of a mere economic nature or not. With this mindset, we can identify three different sets of needs for a physical, logistical connection.

In regard with industrial and/or production related needs, such needs are – as of now and soon – absent. The main industry of the area, the fisheries industry, is no more for obvious environmental reasons, starting from the crucial absence of the waterbed. Even if the Northern Basin is currently recovering and, on its way, to resemble at least part of the Area's former environmental glory, there is no room for exploitation yet: fisheries are still too small to be capitalized on, thus the wet area can be perceived at the current time as a large sort-of-reserve, and a laboratory for experimentation in environmental regeneration. In effect, the (far more than) partial isolation of the Northern Basin deeper areas contribute to the possibility of keeping it safe. On the other hand, the Southern Basin presents a different scenario: the Uzbek government has in discussion at least two projects had been as an "alternative" to the regeneration of the area, involving the acceleration of the desiccation to favor the development of extracting operations, or the planting of trees to "reconvert" the area in a green/forest area. The current commitment under Uzbek jurisdiction, thus, has been far more efficient in the recovery phase, leaving the area in a condition far more behind of its northern counterpart. The remains of the Southern Basin waters offer a creepier scenario with a more profound absence of any kind of need to reach or traverse them, save for research purposes the deeper areas of the desiccated area suffer also from heavy pollution and salt storms, making it a proper wasteland. This element brings us to the link to the second element to be taken into consideration: tourism. Both basins still offer some interesting sights for their (surviving) shores, but the area is not widely known, being often completely absent from the national tourism portals[16]. The Aral suffers the reputation of being "niche" area more linked to disaster tourism, paradoxically keeping tourist inflows low due to the very nature of the "attraction", creating a sort of catch-22 situation. Finally, transport is related to the need for maintaining social linkages and connection among communities. The desiccation of the Area and the destruction of the two main economic activities have been the main drivers for the depopulation of the zones surrounding the former wet area. In addition, the decline in the health level of such zones further contributed to forcing people to abandon them. Clearly, abandoned areas only need one paved way – *the way out*.

As mentioned, and as often happens in different contexts, the absence of consistent and tangible drivers for infrastructural development fuels a chronical underdevelopment of the infrastructure itself due to the lack of a stronger need for its establishment, implementation, and/or improvement. Indeed, particularly for the Southern Basin, the former wet area is set to be an unmapped and untamed landmark, until concrete efforts for its recovery will be made, or will be further developed as for the Northern Basin.

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