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MECHANICAL LOOTING OF ARCHAEOLOGICAL SITES IN AFGHANISTAN

2023

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DAFA

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Figure 1 : Geography of Afghanistan

I- PROJECT OVERVIEW

Since its creation in 1922, the French Archaeological Delegation in Afghanistan (DAFA) has played a pivotal role in expanding knowledge of Afghanistan's cultural heritage and safeguarding it. Throughout its history, DAFA has often navigated a volatile geopolitical landscape and has adapted as necessary. Since August 2021, following the establishment of the Islamic Emirate of Afghanistan, DAFA no longer maintains a physical presence in the country. However, Afghanistan's cultural heritage faces unprecedented threats from economic, political, and environmental factors. In response, DAFA has innovated and developed new tools to continue its mission remotely. As a result, the long-standing partnership between DAFA and Iconem has been reactivated and reoriented.

1.1- A network of oases

The Balkh Oasis, located in the province of the same name, spans more than 14,000 km² across the plains along the left bank of the Amu Darya River, which forms Afghanistan's northern international border. It is part of a network of oases stretching from the Kunduz Oasis in the east to the Merv Oasis in Turkmenistan in the west. The oasis is irrigated by approximately ten canals fed by the Balkh-Âb (the Balkh River), which water the Afghan Turkestan plain. While the city of Mazâr-e Sharîf serves as the provincial administrative capital, the city of Balkh remains the central hub of this network, as it likely has been since its inception.

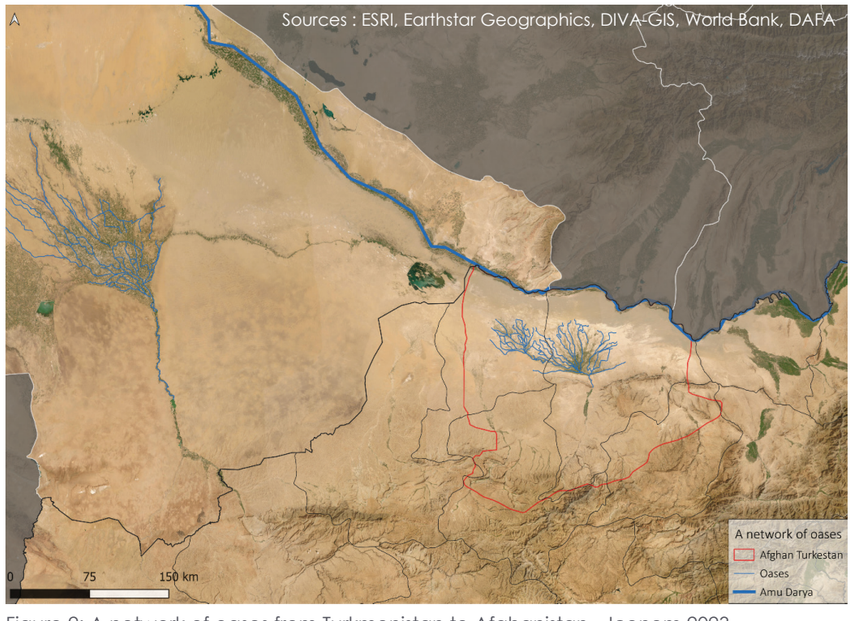

Figure 2: A network of oases from Turkmenistan to Afghanistan – Iconem 2023

1.2- A region prone to political upheaval

The recent history of the area involved in this project reflects the turbulence experienced by Afghanistan. Its proximity to the former Soviet Union initially shielded it from the power struggles among Soviet forces, their supporters, and their opponents.
From 1989 to 1998, Rashid Dostum, backed by a sizeable militia, controlled northern Afghanistan, and established a proto-state. During this period, organized campaigns to loot archaeological sites occurred. In 1998, the arrival of the Taliban, following a period of intense and violent "normalization," allowed them to take control of much of the region.

Following the 11 September attacks, an international intervention was launched in October 2001. Coalition forces, supported by various Afghan factions (the Northern Alliance, Uzbek militias loyal to R. Dostum), fought against Taliban troops. By the spring of 2002, armed resistance from the Taliban in the region had largely ceased, and a new administration was established, led by Mohammed Atta Nour, a prominent Northern Alliance member with strong local support.
Until 2008, the Balkh Oasis remained relatively peaceful, but by 2009, the situation began to deteriorate, with increasing portions of the area slipping out of the Islamic Republic of Afghanistan's control. By 2016, groups affiliated with Daesh were reported in the northwest of the oasis, leading to numerous clashes with both government forces and the Taliban. During this time, looting resumed, facilitated by the use of heavy machinery. In March 2021, the city of Balkh came under the control of the Islamic Emirate, and by the end of July of that year, Mazâr-e Sharîf had surrendered to the new rulers without significant resistance.
Since then, the new administration has consolidated its control, encountering minimal opposition from political opponents or remnants of the previous government. Daesh activity has significantly diminished, although it remains uncertain whether the group or its supporters are still present in the region.

The start of construction of the Qosh Tepa Canal (1) in March 2022 marks a new phase in the management of northern Afghanistan's archaeological heritage. The planned excavation works required for the Canal's construction will affect the northern part of the oasis, a poorly documented area of dunes spanning over 200 kilometres. The sites affected by the construction work have already been identified, whether they are at risk due to the earthworks themselves or through the management of excavated material and deposits, which in some places can reach up ten meters in height.

(1) Ministry of Borders, Tribes and Tribal Affairs. (2022). Qosh Tepa Canal. Kabul: Periodicals Magazine.

1.3- Introduction to the study

Since 2019, DAFA has not been able to return northern Afghanistan and was forced to withdraw entirely in August 2021. Nevertheless, the study of Afghan heritage remained possible through the use and analysis of satellite imagery. DAFA possesses an extensive database on archaeological sites located in northern Afghanistan, which has been developed since 1923. This database combines field observation reports, studies of archaeological material from excavations or surveys, and a substantial collection of photographic documentation. DAFA also retains human expertise, as some employees involved in past excavations and surveys remain active.

The first objective was to detect and classify sites impacted by the looting campaigns observed since 2012. This report provides an inventory of the archaeological sites that have been destroyed or are in the process of being destroyed in Afghanistan. As the systematic identification of sites continues, and our inventory is continuously updated, the findings in this report are likely to evolve as our study progresses.

The study was conducted in several phases, with the first phase taking place from April to October 2023. Various sources were used, primarily satellite images, scientific publications and press articles. The sites destroyed by mechanical means are predominantly located in northern Afghanistan, specifically in the provinces of Balkh and Jowzjan, and to a lesser extent in the province of Kunduz. As of 1 December 2023, 242 sites mechanically destroyed between December 2016 and February 2022 have been identified, which represents approximately 7% of the sites listed by DAFA (2) .

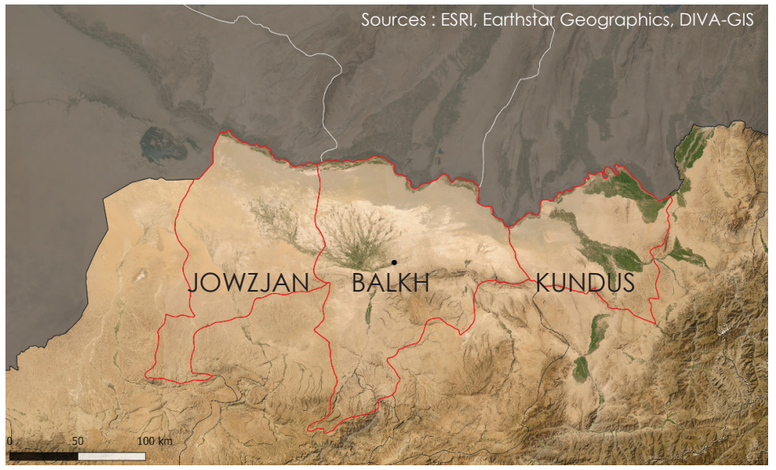

Figure 3 : Analysed provinces in the first instance

(2) DAFA's GIS database

1.3- Archaeological sites excavated and documented

The first archaeological excavations at Balkh in 1923 marked the beginning of scientific data collection on archaeological sites in northern Afghanistan. Alfred Foucher (3), who founded DAFA in 1922 and directed it until 1945, documented these early findings in his two-volume work, The Old Road to India. These volumes remain crucial for understanding the sites and their development. Further valuable insights can be found in Foucher's correspondence, which was edited by Annick Fenet in 2010 and published under the title Documents d'archéologie militante: La mission Foucher en Afghanistan (1922-1925(4) .
When DAFA resumed its activities in northern Afghanistan in 1945, extensive surveys and excavation campaigns were conducted between 1947 and 1955. Extensive documentation from this period is available through the works of Daniel Schlumberger and M. Le Berre, with some parts published (5) and accessible via the archives of "Maison de l'archéologie et de l'ethnologie in Nanterre".
Rodney Young's 1953 study of the Balkh fortifications, published in the American Journal of Archaeology (AJA)(6) , is archived at the University of Pennsylvania in Philadelphia.
From 1969 to 1975, a Soviet team led by G. Pugatchenkova carried out an important survey of the northern part of the Balkh Oasis.

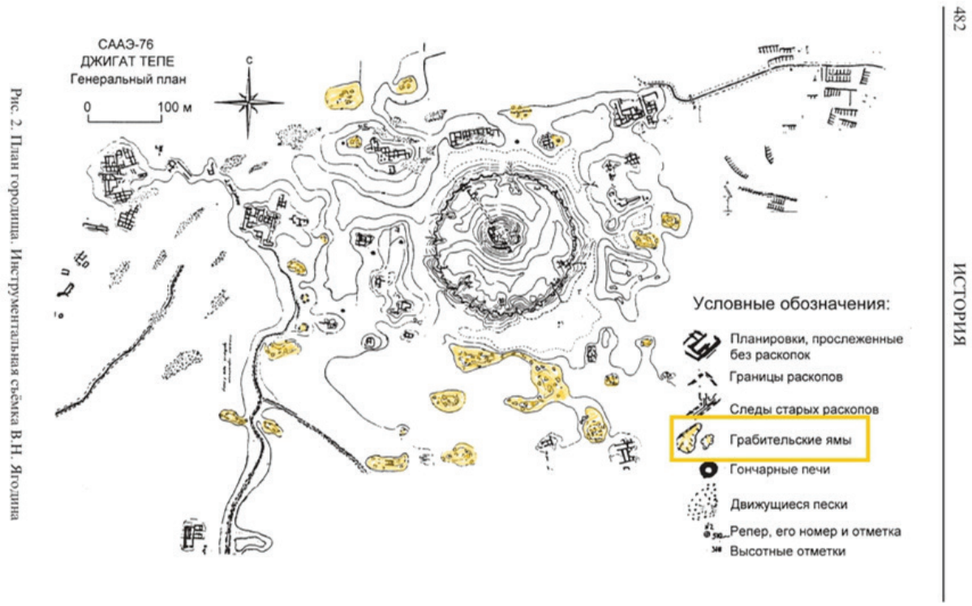

Figure 4: Sketch of the Jiga Tepe archaeological site (Vadim Yagodin, 1976), already showing signs of looting

This extensive work led to the identification of several hundred archaeological sites, documenting periods of occupation ranging from the Upper Palaeolithic to the Mughal period. The published data are accessible, and the archives from this mission are expected to be available in the near future.
From 2002 onwards, DAFA aimed to create an exhaustive inventory of all sites in the Balkh Oasis. Between 2003 and 2009, the entire oasis was surveyed, building upon previously acquired information. Improved accessibility and the use of satellite imagery enabled more precise analysis, which was further enhanced by field verification and on-site material collection to refine the chronological accuracy of the study.

Today, various factors threaten these sites. Political instability and the lack of a central government presence in the north have encouraged the looting of these already vulnerable locations. Additionally, several major development projects, such as the Turkmenistan-Afghanistan-Pakistan-India Gas Pipeline (TAPI) in south-western Afghanistan and the Qosh Tepa Canal in the north, have been underway for years.

Some sites along the canal's route were destroyed during its initial construction phase, while others were looted (7) . However, according to some sources(8) , some sites have been deliberately avoided, as evidenced by the canal's route deviation near the site of Zadian(9).

(3) FOUCHER, Alfred. La vieille route de l'Inde de Bactres à Taxila II. MDAFA, I, 1942.
(4) FENET, Annick. Documents d'archéologie militante : La mission Foucher en Afghanistan (1922-1925), 2010.
(5) For example: SCHLUMBERGER, Daniel. Report on a mission to Afghanistan. Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres, 1946, vol. 90, no 2, p. 169-177; SCHLUMBERGER, Daniel. Compte rendu des travaux et projet de la délégation archéologique française en Afghanistan. Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres, 1947, vol. 91, no 1, p. 118-119.
(6) YOUNG, Rodney S. The south wall of Balkh-Bactra. American Journal of Archaeology, 1955, vol. 59, no 4, p. 267-276.
(7) Satellite observation of Planet images
(8) Abdul Saboor Sirat. (2023, 24 janvier). Qush Tepa canal route changed to protect Balkh's Kafer Kala fort, Pajhwok Afghan News. https://pajhwok.com/2023/01/24/qush-tepa-canal-route-changed-to-protect-kafer-kala-fort/.
(9) Cf. appendix n°1 suggested infra. p. 25

II- METHODOLOGY

The initial phase of the study focused on analysing satellite imagery to detect and characterise signs of looting at archaeological sites in the provinces of Balkh, Jowzjan and Kunduz (10) . This work led to the creation of a typology of mechanised looting traces (11), with all sites in northern Afghanistan being examined.

The second phase, which has been underway since October 2023, broadens the approach to address anthropogenic destruction of archaeological sites more comprehensively. This phase expands the scope to consider a wider range of destruction causes and includes a geographical extension to cover all of Afghanistan.

We initially worked with a database previously established by [2]Philippe Marquis on Google Earth, focusing primarily on northern Afghanistan. This database includes 1,988 detected archaeological sites, of which 73 are reported to have been looted. All this information was converted into a GIS(12) database and processed using QGIS software. The project also incorporated data on two major development projects: the TAPI gas pipeline (in the southwest) and the Qosh Tepa canal (in the north).

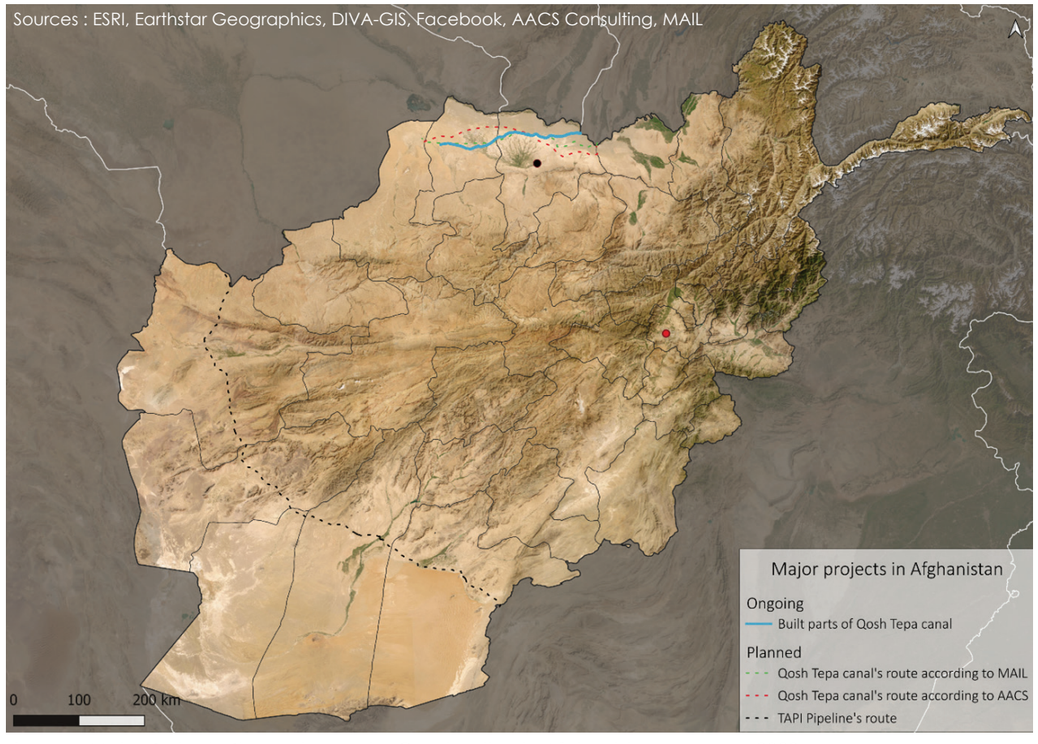

Figure 5: Major Projects Planned or Under Construction in Afghanistan – Iconem 2023

(10) The disproportionate occurrence of looted sites in northern Afghanistan guided an initial approach centred on these provinces.
(11) Cf. infra p.
(12) See Appendix 2, p. 25

II- METHODOLOGY

The classification of the sites began using a variety of complementary sources, primarily satellite images, along with press articles and scientific publications. The main sources of satellite imagery included Google Earth and Planet, with additional data from Maxar and ESRI. While some of these images are freely accessible(13) (e.g., Google Earth, ESRI, Sentinel Hub), others require payment or special agreements (e.g., Maxar, Planet).
Google Earth images were used for their high spatial resolution, which allowed for the identification of destroyed archaeological sites, the type of looting, its footprint, and the technical aspects of the looting activities. In contrast, Planet images were valued for their excellent temporal resolution, enabling us to determine the start date of looting activities. For approximately one hundred sites, we were able to establish the start date of looting to within a month.
To facilitate access to and use of these images, several tools have been developed or improved. One of these tools, called the Historical Satellite Iconem (14), provides an interface for comparing images of the same area from different satellites and allows for the extraction of these comparative images. This tool is particularly valuable for observing and interpreting the evolution of an archaeological site and its transformation over time. Additionally, the ability to access a diverse range of images from a single platform enables a comprehensive understanding of a site, including its temporal changes, significant alterations, patterns of use, and types of occupation.

The sites were initially classified into three distinct categories:
Non-looted sites:
This category includes sites that show no apparent signs of damage related to looting (15) .
Manually Looted Sites:
These sites have been looted manually, primarily using shovels. Some instances of looting date back to the previous century (16) , and the density of observed cavities varies significantly.
Mechanically Destroyed Sites:
This category encompasses sites that have been destroyed using mechanical equipment.

At the conclusion of this initial classification, our study included 954 sites that were not looted, 784 sites that had been manually looted, and 136 sites that had been destroyed using mechanical devices.

(13) See Appendix n°3, p. 25
(14) See Appendix n°4, p. 26
(15) We should be cautious about sites considered unlooted, and emphasise that this initial classification is based only on the available sources that could be reviewed. The absence of clear signs on satellite images does not necessarily mean a site has been untouched. Looting can involve lateral tunnel digging, which is harder to see from above, or other types of theft, such as stealing surface artefacts, manual collection, or accidental finds.
(16) Soviet archaeological expeditions in the 1970s had already described this phenomenon (see Fig. 2, p. 6). The archaeologists who excavated the site of Jiga Tepe documented these holes and believed they were made by local residents searching for artefacts.
Кругликова 2004 — Кругликова И. Т. Джагат-тепе // Проблемы, истории, филологии, культуры. 2004. Вып. XIV. С. 479–561.

3.1- From looting

Our study focuses on the last category of looting, namely sites mechanically looted. Through a thorough analysis of these sites, we established a typology of mechanical looting: sites may have been levelled, earth-moved, or mechanically excavated (17). Some sites exhibit multiple types of mechanical looting.

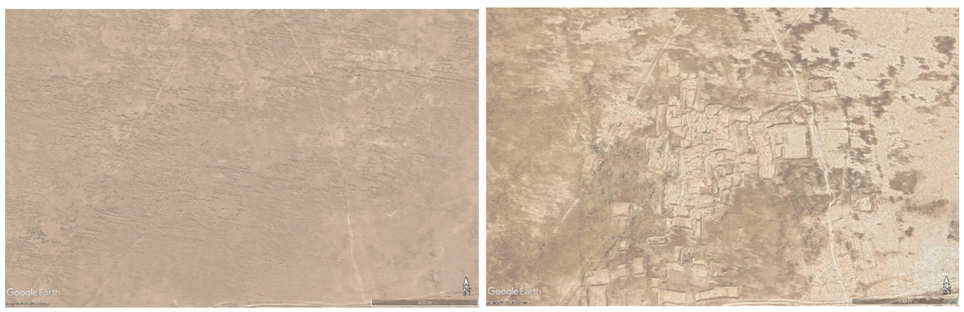

Figure 6: Leveled Site, 2011 - 2022

Figure 7: Earth-moved Site, 2011 - 2022

Figure 8: Mechanically Excavated Site, 2011 - 2022

(17) This terminology, commonly used by operators of mechanical equipment, is favoured for its clarity and general applicability.

Throughout the study, we observed that some mechanically looted sites were later subjected to agricultural exploitation or urban sprawl. Consequently, we revised our terminology to account for these phenomena. Sites with clear evidence of mechanical destruction were then referred to as “destroyed sites.”, and a typology to classify the purposes behind this destruction was established, distinguishing between the categories of “Looting,” “Agriculture,” and “Infrastructure Development”.

Figure 9 : Site destroyed for looting 2011 - 2022

Figure 10 : Site destroyed for agriculture 2011 - 2022

Figure 11 : Site destroyed for urban sprawl 2004 - 2022

III- OBSERVATIONS

Overall, the temporal resolution of Google Earth images primarily shows the before and after states of sites. However, a few rare images provide insights into the destruction process itself. Once collected, this data was processed and compared.

A preliminary chronology of mechanical destruction at archaeological sites in the Balkh Oasis has been established. This map highlights only the sites for which looting can be precisely dated. Initially, looting occurred in the western part of the oasis and then progressively moved toward the centre and eventually to the east.

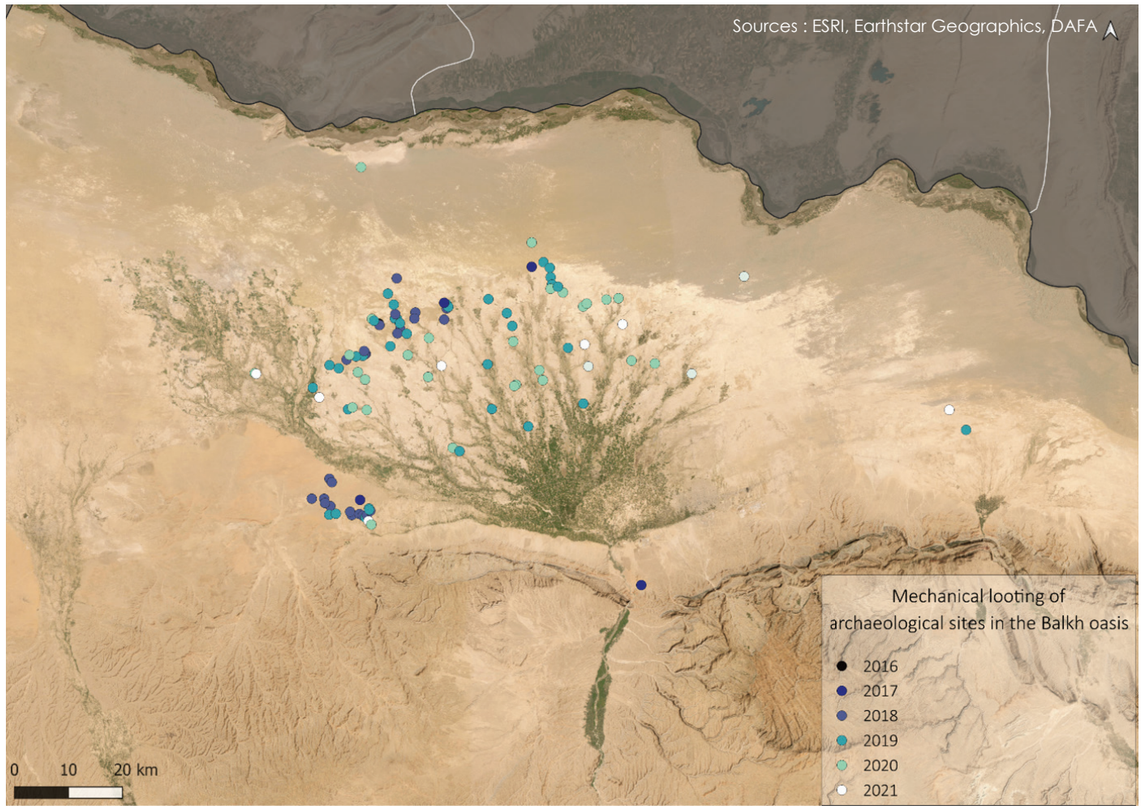

Figure 12: Mechanically destroyed archaeological sites from 2016 to 2021

III- OBSERVATIONS

The data also revealed trends in destruction that were more pronounced than others.

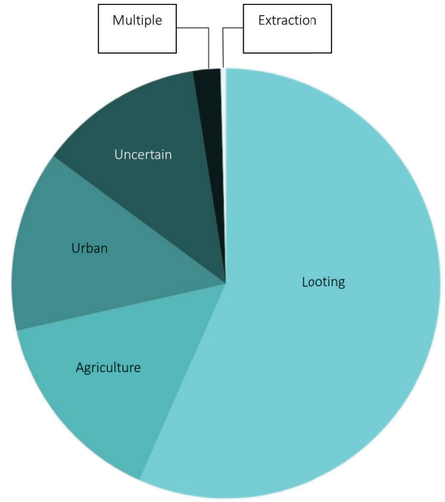

Figure 13: Mechanically destroyed archaeological sites from 2016 to 2022

The pie chart above (Figure 13) provides a visual representation of the causes of destruction of archaeological sites in Afghanistan as considered in our study:

Urban: This category encompasses sites impacted by urban sprawl, including the construction of new buildings, bridges, and other infrastructure, as well as informal roads and paths created by frequent vehicle traffic.

Multiple: This category refers to sites affected by various causes of destruction. For instance, some sites were initially destroyed for agricultural purposes and were later further damaged by infrastructure development. Others were looted, with subsequent destruction occurring during the cultivation of the affected plots.

Extraction: This category identifies sites damaged by resource extraction activities, such as the removal of land, minerals, and other materials.

More than half of the sites have been destroyed by looting, with these sites predominantly located in the northern regions of the country; only one mechanically looted site is found in southern Afghanistan (Kandahar province). Significant destruction has also occurred due to urban sprawl and agriculture, which together account for over a quarter of all destruction. The latter cause is relatively recent and reflects the adoption of new, mechanised agricultural techniques that are more aggressive than those previously used. Additionally, sites affected by multiple causes are less commonly found, but may indicate the opportunistic reuse of affected areas.

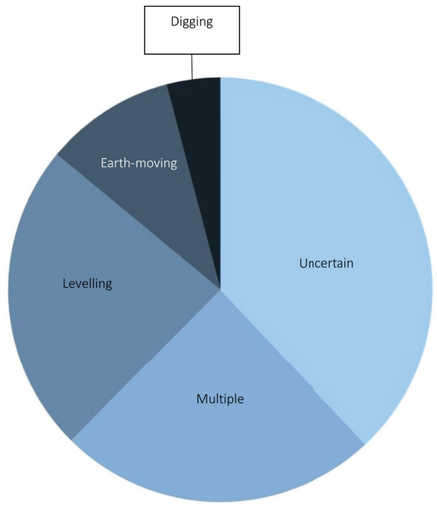

Figure 14: Techniques used for destroying archaeological sites in Afghanistan

Similarly, certain methods of destruction are more prevalent than others. The second diagram (Figure 12) provides insights into the techniques used for site destruction. While most of the time the means employed were uncertain (38% of the sites), many sites also appeared to have been destroyed through multiple techniques. Approximately a quarter of the sites are first levelled and/or earth-moved before being mechanically excavated. The diversity of methods of destruction can offer clues regarding the quantity of machinery used on those sites. Typically, the topography of these sites made them easily noticeable and recognisable to the looters.
23.6% of the studied sites seem to have been destroyed by levelling. Originally, levelled sites generally have low features or even negligible relief. While many mechanically looted sites do have significant topographical features and are thus more visible, the substantial proportion (nearly a quarter) of sites affected by levelling suggests that looters have a certain level of familiarity with the area.

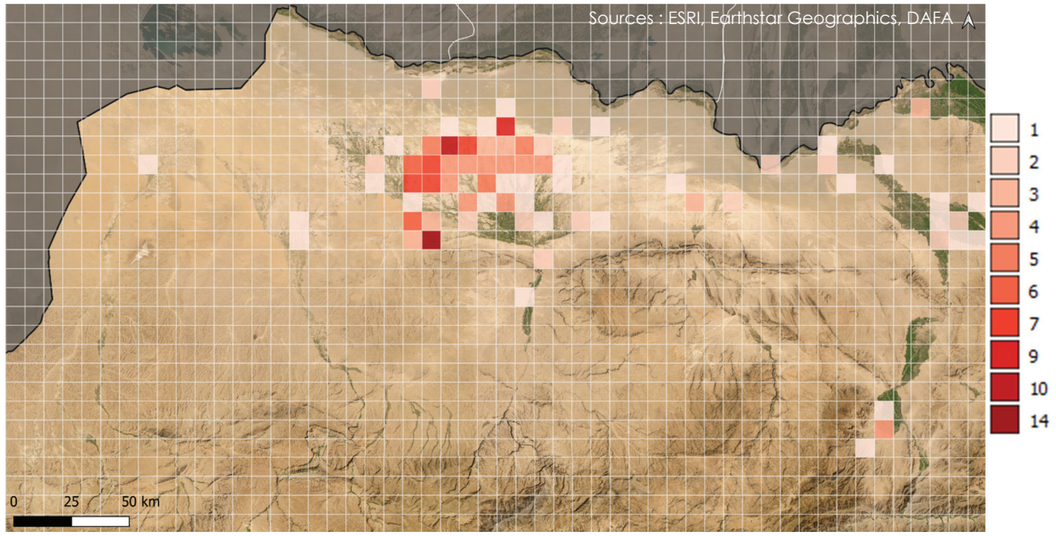

Figure 15: Number of looted sites per 100km2 – Iconem 2023

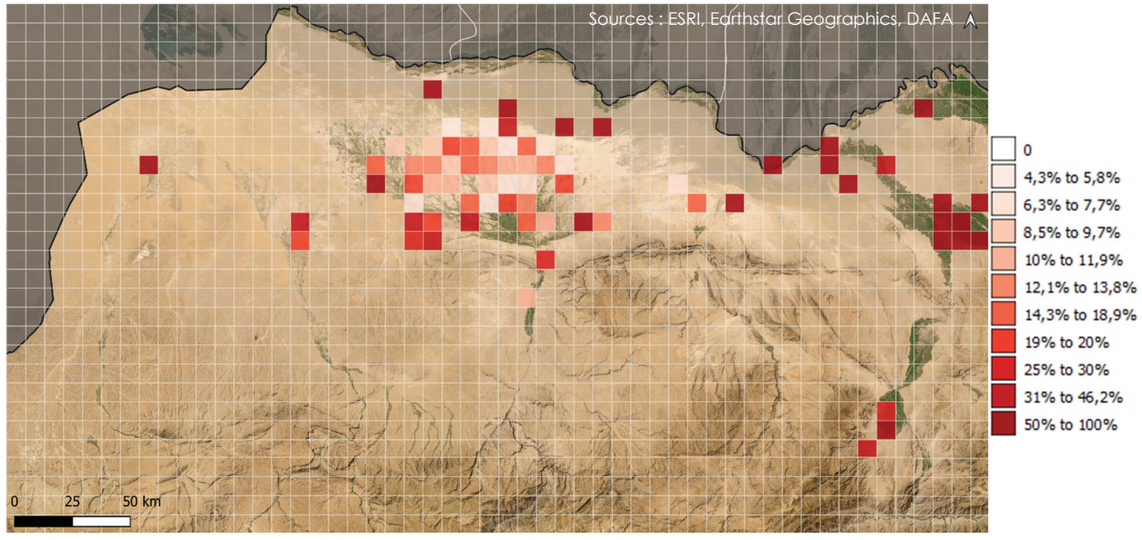

Figure 16 : Looted sites ratio (compared to total number of archaeological sites) per 100km2 – Iconem 2023

The map above (Figure 14) reveals a higher incidence of looting to the eastern and western part of the Oasis, indicating that looting is more prevalent on the periphery. Two factors may explain this trend: First, operating in populated areas is more challenging for looters, as their activities are more likely to be detected. Second, archaeological sites are more densely concentrated within the oasis itself compared to the surrounding areas.

3.2- To anthropogenic destruction

Similarly, certain methods of destruction are more prevalent than others. The second diagram (Figure 12) provides insights into the techniques used for site destruction. While most of the time the means employed were uncertain (38% of the sites), many sites also appeared to have been destroyed through multiple techniques. Approximately a quarter of the sites are first levelled and/or earth-moved before being mechanically excavated. The diversity of methods of destruction can offer clues regarding the quantity of machinery used on those sites. Typically, the topography of these sites made them easily noticeable and recognisable to the looters.
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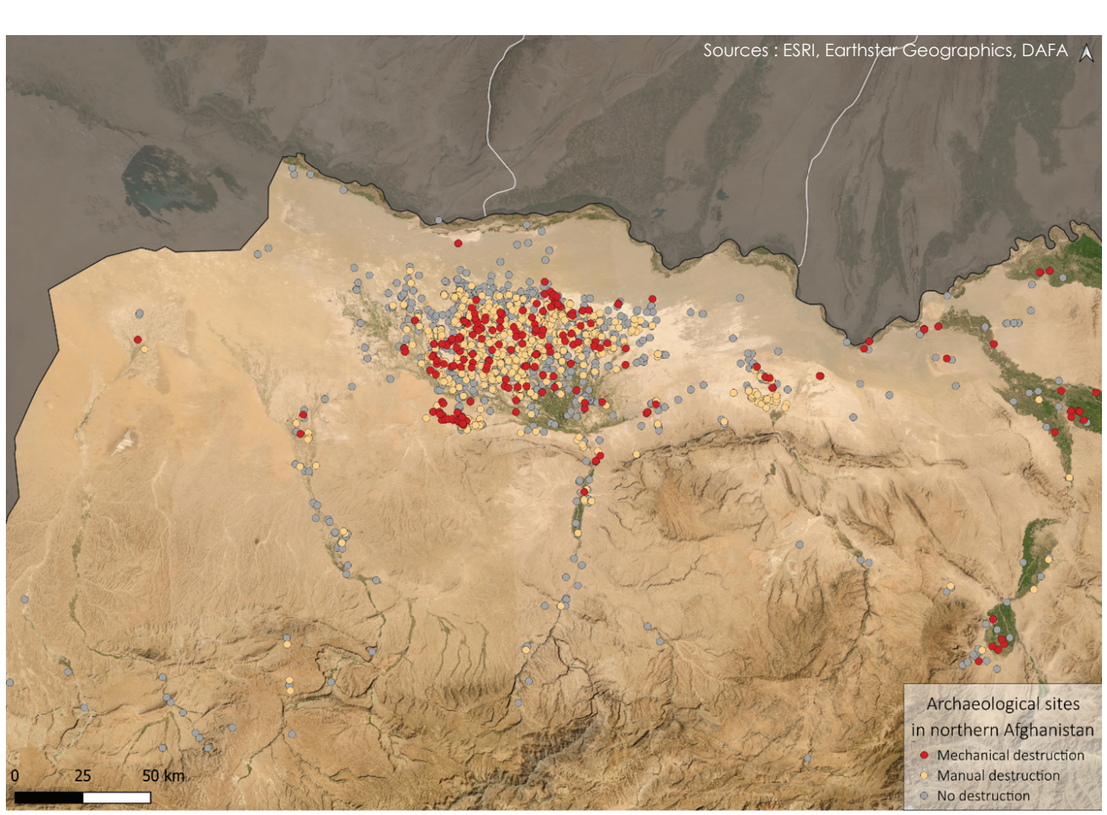


Figure 17: Classification of archaeological sites in northern Afghanistan

Our initial hypothesis, which led us to limit the geographical scope of our study to the Balkh oasis, was that mechanical destruction for looting purposes was largely confined to the province of Balkh and its neighbouring areas. The proximity of the Qosh Tepa Canal to these provinces suggested a possible link between its construction and the mechanical looting of sites in the region.

By broadening our analysis to include wider factors of anthropogenic destruction, we were able to refine previous observations, particularly concerning sites damaged by agricultural and urban sprawl. This approach allows us to better understand local and regional trends across Afghanistan and explore potential seasonal patterns related to soil characteristics and land use.

Some sites that were previously deemed uninterpretable due to their complexity have been re-evaluated. The marks they bear could be from trenches or other forms of excavation, but whether these were created manually or mechanically remains uncertain

The analysis of the destruction of archaeological sites in Afghanistan, particularly looting, requires expertise from various disciplines, including an understanding of the machinery involved and of the regional geopolitical context. Due to our limited knowledge in these areas, we sought advice from several specialists.

First, we consulted Michael Semple, a professor at the University of Belfast and an expert on Afghanistan, to discuss issues related to the Qosh Tepa canal, and the possible involvement of certain stekeholders in the looting.

Next, we spoke with construction workers to gain insight into the impact of machinery on the ground. We met with site supervisors and visited construction sites to observe how machines operate in different terrains. Although aware of the differences between the soil in France and Afghanistan, our primary goal was to understand the machinery's role and capabilities. We also shared images of destroyed sites with these professionals to further inform our analysis. Finally, we sought to quantify the destruction we observed. Several methods were considered, including calculating the depth of ditches created by machinery through shadows on satellite images. Although approximate, this method provides a useful estimate of the scale of destruction.

4.1- The Qosh Tepa Canal: An Ancient History

The current irrigation system for the plains north of the Amu Darya relies heavily on rivers descending from the Hindu Kush. As early as the Bronze Age, canal networks were likely established to cultivate extensive areas, which today are bordered to the north by a vast dune system separating the oases from the Amu Darya.

Local traditions suggest that historical canals connected various irrigation networks of the oases. In the 17th century, Mahmud ibn Vali, in Bahr al-Asrar, described efforts by the governor of Balkh, Nader Mohammad Khan (1606-1651), to restore this ancient system. Archaeological evidence of this attempt is still visible in satellite images, confirming the existence of canals linking the Balkh and Shebergan oases.

4.2- From Project to implementation

The canal project, aimed at irrigating the northern oases of Tashkurgan, Balkh, and Sheberghan, was revivded in 2018. A feasibility study was conducted by the American company Aecom as part of its Strengthening Watershed and Irrigation Management (SWIM) program, and the consulting firm AACS Consulting. In collaboration with Afghanistan's ministries of Agriculture, Irrigation, and Livestock (MAIL), and Energy and Water (MEW), the project received $3.6 million in funding from U.S. Agency for International Development (USAID). Initially, the canal was planned to stretch over 200 kilometers and irrigate 500,000 hectares.

The project was divided into two phases:

The first phase involved digging the canal, constructing water intake infrastructure, regulating water flow, and stabilising the banks

The second phase included the construction of a dam, related infrastructure, and a pumping station.

Both phases were expected to be completed within three and a half years. In April 2019, an unofficial Facebook page "Economic Development of Balkh" published a map made by the MAIL. However, this map was not officially published. It showed a different canal route compared to the one proposed in AACS Consulting's feasibility study.

Since the Taliban's rise to power in August 2021, the Islamic Emirate has taken over the project, which had theoretically begun under Ashraf Ghani's administration. The resumption of work was officially announced at the end of March 2022, as confirmed by initial observations from satellite images of northern Tashkurgan. During its implementation, the project has undergone modifications, and the current canal route no longer follows AACS Consulting's initial plans. The canal now extends to 285 kilometres in length, is 152 metres wide, and 85 metres deep.

The estimated cost of the project is 60 billion Afghanis ($684 million), entirely funded by national revenue, primarily from coal mining. According to the authorities of the Islamic Emirate, the canal is expected to be completed five years after construction began, by early 2027.

The project aims to achieve two main objectives:

1. Irrigate the region.

2. Demonstrate the Taliban's ability to govern the Islamic Emirate, with the hope that this achievement will contribute to the country's agricultural self-sufficiency.

4.3- An Extraordinary Achievement

A para-governmental body, the Afghan National Development Company (NDC), is overseeing the project and coordinating the efforts of 120 private companies involved in constructing the canal. According to official sources, the project employs 5,500 people and utilizes between 3,300 and 4,000 machines. To date, approximately 106 kilometres of the canal have been dug, and 720,000 m³ of sediment is being removed daily. However, it appears that the construction schedule has been adjusted, with only 140 km expected to be completed in the first phase of the project. Our satellite imagery observations also indicate irregular progress, with periods of intense activity (with two teams working in shifts, day and night) alternating with complete halts in excavation. Several factors may explain this irregularity:

- Logistical challenges associated with operating heavy machinery (fuel supply, maintenance, etc.).

- Climatic constraints (frost, sandstorms, extreme heat).

The construction method involves excavating sections several hundred metres long and about one hundred metres wide, with the soil being deposited on either side. Access routes are reserved and then removed as work progresses. Infrastructure crossing the canal, such as the road from Mazar-i-Sharif to Hairatan (near the Uzbek border) and the parallel railway line, was completed by the end of the first phase (summer-autumn 2023).

The realisation of such a project has not been without criticism, both in terms of the technical aspects of construction and the long-term sustainability of such infrastructure. Additionally, the social and economic impact of bringing new areas under irrigation have been questioned. Regionally, the project has raised significant concerns, especially as Afghanistan was not party to the most recent agreements governing the distribution of the Amu Darya's water – the Tashkent Agreement in 1987 and the Almaty Agreement of 1992. The decision to build this canal was made unilaterally, without a negotiated framework involving the other riparian states of the Amu Darya. Activating the canal without prior consultation could lead to serious geopolitical and environmental consequences.

Several technical factors have already been identified that will need to be addressed to ensure the canal's long-term sustainability:

The risk of silting, linked to the erosion of the banks and significant aeolian deposits in the dune areas through which the canal passes.

Water loss, due to the insufficient waterproofing of the structure.

Flood Damage, since the canal is vulnerable to partial destruction from "exceptional" floods originating from rivers that feed the oases' irrigation networks, potentially affecting the canal zone.

Seismic risks in the area.

In any case, ensuring the efficient operation of the canal will require substantial and ongoing resources.

4.4- A Context Conducive to the Looting of Archaeological Sites

It is highly likely that the machinery used for constructing the Qosh Tepa canal is the same as that employed in the mechanical looting of archaeological sites in the regions traversed by the canal. Several indicators support this conclusion:

First, there is a clear correlation between the time-lines of the looting and the canal's construction. Mechanical looting in the region began in December 2016, with the last known looting in February 2022. Canal construction began in June 2021. The looting activity peaked twice: first in early 2019, and again at the start of 2020, with a final surge in mid-2020 before decreasing just prior to the start of canal works. Shortly after the construction began, the site experienced a pause when the Taliban took power. During this hiatus, several instances of destruction, including confirmed looting, were observed. Looting ceased once construction resumed. Thus, the looting and the canal construction have never occurred simultaneously but rather in alternating phases. This suggests that the machinery might be dedicated exclusively to canal construction when it is active, leaving no available resources for mechanical looting during these periods.

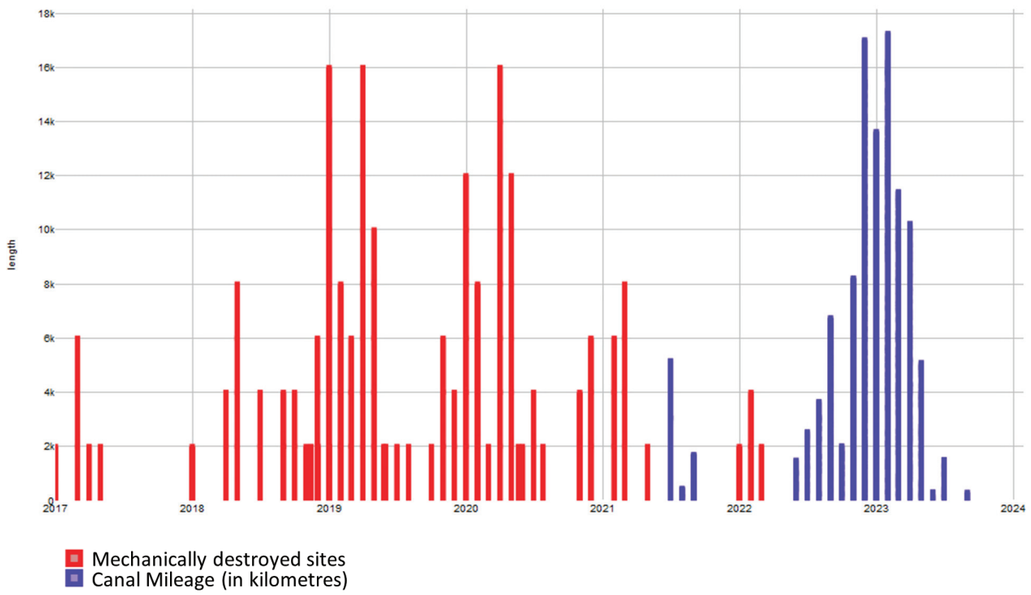


Figure 18: Chronology of Mechanical Looting and Construction of the Qosh Tepa Canal

The second clue comes from observations of these sites post-looting, revealing three main types of destruction previously described: earth moving, mechanical excavation, and levelling. The traces left by these activities are identical to those made by the machinery observed in images and videos of the canal construction site, published by both official sources and various amateur footage. Two particular machines stand out : the grader and the mechanical shovel, which correspond exactly to the equipment used for looting archaeological sites.

However, uncertainty remains regarding the machinery responsible for earth-moving the sites. According to construction workers, this level of destruction typically requires bulldozers. However, no bulldozers have yet been observed at the canal site, leading to three possible hypotheses concerning the earth-moving of archaeological sites:

1. Bulldozers may have been active on the canal site but were not visible in the analysed images.

2. There may have been no bulldozers at all, and the loaders seen in large numbers on the Qosh Tepa canal construction site may have been responsible for destruction.

3. Bulldozers may have been used to destroy these sites without being employed in the canal project.

Furthermore, it was assumed that the machines used in the canal construction were the same ones responsible for the looting of archaeological sites. This assumption is based on the fact that the destruction was organized and systematic, which could only have been carried out by professionals within the construction sector. Additionally, much of the country's mechanical equipment had been requisitioned for the canal construction. It is possible that these machines, along with their operators, arrived in the Balkh oasis and surrounding areas ahead of schedule. During the delay in commencing the works, the operators may have taken the opportunity to engage in looting.

IV- PRELIMINARY ANALYSIS

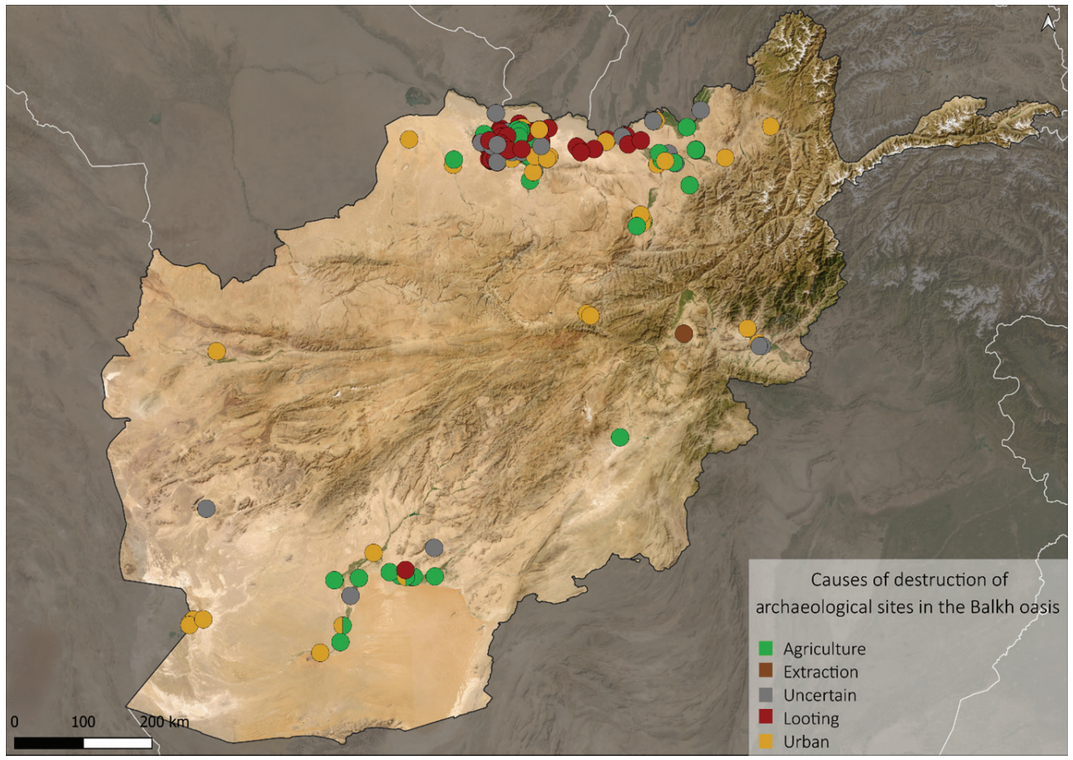


Figure 19 : Various causes of destruction of archaeological sites in Afghanistan – Iconem 2023

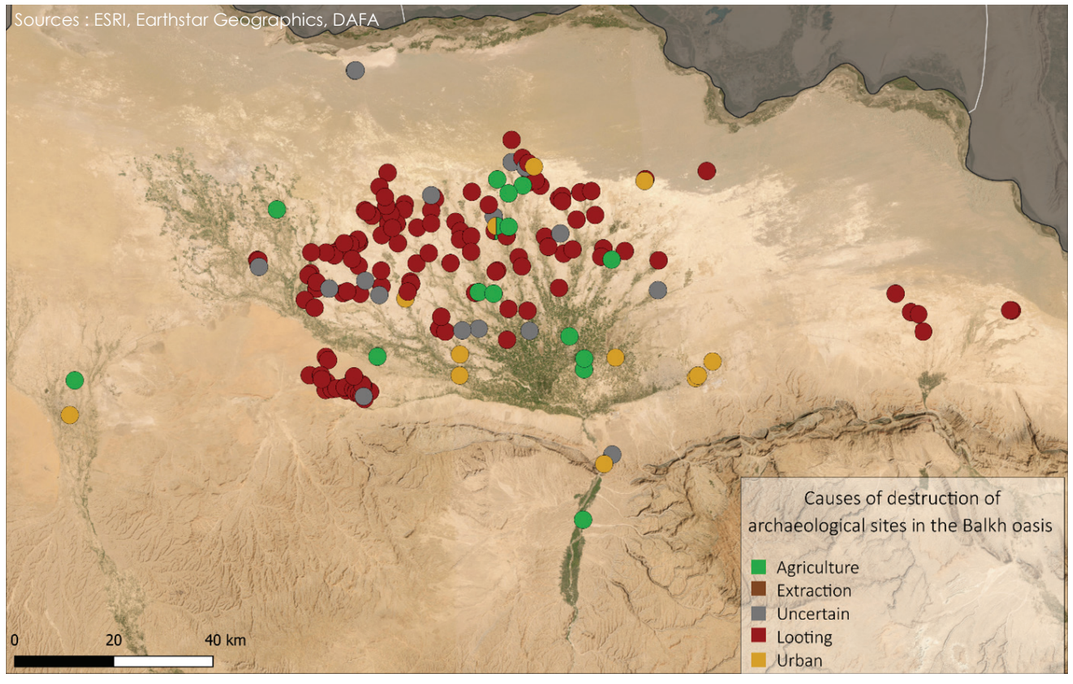


Figure 20 : Various causes of destruction of archaeological sites in Afghanistan – Iconem 2023

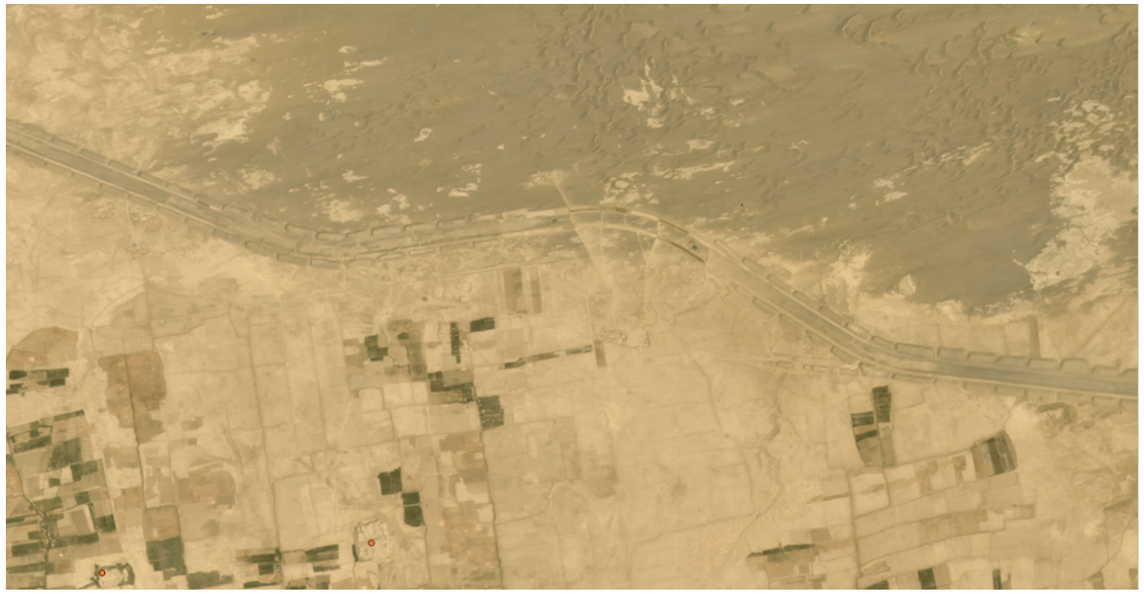
V- CONCLUSION

In recent years, the political and geopolitical situation in Afghanistan has prevented DAFA from continuing its fieldwork. However, by utilizing satellite data, members of the institution were able to resume their research and uncovered a new form of looting at archaeological sites. Whereas looting was previously carried out manually, it now involves the use of specialized construction machinery. DAFA sought the expertise of Iconem for its knowledge in this area. Since then, both organizations have collaborated to investigate this new form of looting, which is suspected to have been exacerbated by the construction of the Qosh Tepa canal.

The continuation of this study aims to either confirm or refute this hypothesis: if mechanical looting is found to occur across the entire country, especially far from major construction projects, the hypothesis would need revision. Conversely, if mechanical looting remains confined to the north or near the planned pipeline construction zone, the hypothesis will remain credible, pending further supporting evidence.

However, some chronological elements raise questions about this assumption. The mechanical looting we have identified began in December 2016 and persisted into 2017, intensifying in early 2019 and 2020 before declining. Yet, the first feasibility studies for the Qosh Tepa canal were carried out in 2018, and no earlier trace of this project has been found. If there is indeed a correlation between the canal construction and mechanical looting, how can we explain the looting starting over a year before the first canal-related projects ?

Additionally, observations made during the analysis of mechanical looting have drawn attention to the destruction of other archaeological sites across the country. Unlike in the Balkh oasis, these destructions are driven by urban sprawl and more aggressive agricultural practices introduced through mechanization. It is crucial to extend this analysis to these sites in order to prevent further damage to Afghanistan's archaeological heritage.



Appendix 1: Deviation of the Canal's Route to Preserve the Zadian Site

site_name	starting_date	starting_date_seen	notes	site_number	technique	finalit�?
Tepe-i Morghan	NULL	12/09/2019	NULL	206	Nivellement	pillage
Tepa Qassem	NULL	NULL	NULL	151		Construction d'infrastructures
Parishan Tepe	NULL	NULL	Starting_date : 3...	30	Terrassement	Pillage
Kumsar Fort	31/01/2020	NULL	Pillage actif au m...	62	Nivellement	Pillage
Khwāja Ghaltān bis	NULL	NULL		217		agriculture
Khwāja Ghaltān	NULL	NULL	NULL	216		agriculture
Khan Neshin Castle	NULL	NULL	Occupé par les T...	164		Construction d'infrastructures
Jiga Tepe	13/11/2018	NULL	NULL	1	Creusement, Nivelleme...	Pillage
Guch Tepe	NULL	14/03/2020	NULL	233	creusement	pillage

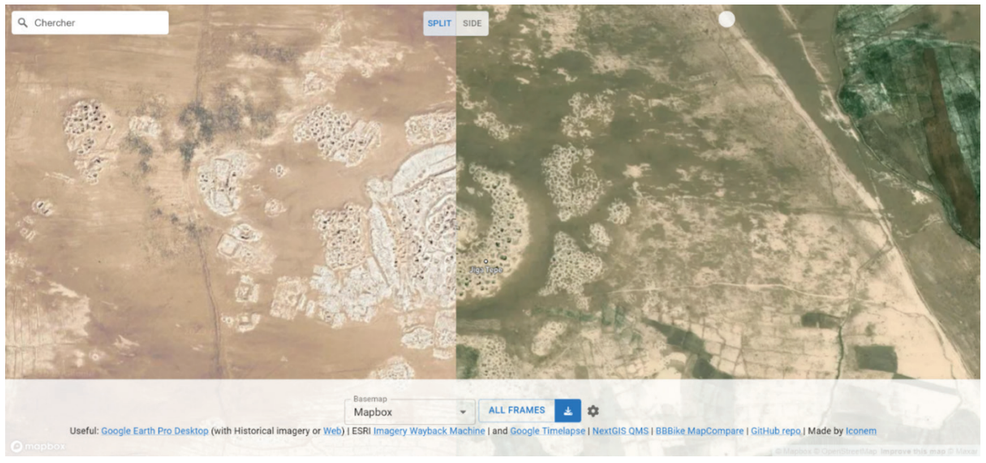
Pillage

Appendix 2: Organisation of the GIS Database

VI- APPENDICES

Source	Access	Resolution	Advantages	Limits
ESRI	Open	30-100 cm	- High-resolution images - Accessible images - Access to historical images (but with a weak resolution)	- Date inconsistencies (a gap of up to 6 months observed) - **Lack of regular image updates**
Google Earth Pro	Open	30-100 cm	- High-resolution images - Timeline tool available, allowing access to past images (as far back as the 2000s)	- Irregular image publication: either no recent images or gaps of 4-5 years between updates
Maxar	Fees	30-50 cm	- Very high-resolution images - Access to historical images	- Charged images
Planet	Fees	600-1000 m	- Images published monthly	- Weak optical-resolution - Charged images
Sentinel	Free	20-60 m	- High temporal-resolution images	- Weak optical-resolution

Appendix 3: Sources of Satellite Data Used



Appendix 4: Interface for Historical Satellite Iconem

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VII- TABLE OF FIGURES

horam

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