

Sáhara Occidental
– *una historia de nuestro tiempo*
en los debates internacionales

**Environmental Reflections of Plundering
Natural resources of Western Sahara. ☐**

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Abstract: The continuous and extensive exploitation of natural resources in Western Sahara has undeniably negative consequences for the environment. However, there is a notable lack of significant studies investigating its environmental repercussions. The marine resources in Western Sahara, exploited by foreign fleets for decades and further depleted under Moroccan occupation, have reached alarming levels. The extraction, transportation, and processing of phosphate rocks from the Boukraa mine, one of the world's largest phosphate mines, have resulted in severe pollution, which pose substantial health risks and contaminate water sources, air quality, soil, and the marine ecosystem. The absence of an effective environmental policy enforced by the Moroccan occupation is directly responsible for this damaging environmental state.

Keywords: SADR, environment, pollution, phosphate,

Resumen: La explotación continua y extensiva de los recursos naturales del Sáhara Occidental tiene innegables consecuencias negativas para el medio ambiente. Sin embargo, existe una notable falta de estudios significativos que investiguen sus repercusiones medioambientales. Los recursos marinos del Sáhara Occidental, explotados por flotas extranjeras durante décadas y esquilados aún más bajo la ocupación marroquí, han alcanzado niveles alarmantes. La extracción, el transporte y el procesamiento de las rocas fosfáticas de la mina de Boukraa, una de las mayores minas de fosfato del mundo, han provocado una grave contaminación, que supone importantes riesgos para la salud y contamina las fuentes de agua, la calidad del aire, el suelo y el ecosistema marino. La ausencia de una política medioambiental eficaz aplicada por la ocupación marroquí es directamente responsable de este perjudicial estado medioambiental.

Palabras clave: RASD, medio ambiente, contaminación, fosfato,

Environmental studies on the effects of intensive overexploitation of Natural Resources in Western Sahara have not yet been conducted. However, there are frequent discussions regarding multiple data showing catastrophic imbalances in water, fishing, and mining sectors, particularly in the occupied territories of Western Sahara. The study conducted for the German Environment Agency on the Bu Craa mine in April 2018 sheds some light on the current and future environmental situation of the region, highlighting the exception that proves the rule.

Due to the lack of specialized environmental studies on the effects of widespread exploitation of Sahara's natural resources on the environment and its impact on both humans and nature, several principal reasons, among others, may be noted as environmental abuses in Western Sahara:

- ✓ The absence of a clear legal framework and national strategy in Morocco for environmental protection, as revealed by the United Nations' environmental performance review in 2014¹.
- ✓ The prevalence of corruption and clientelism, which shield actors in the fishing and mining sectors in occupied Saharawi territories from punishment, while the Moroccan king's family and senior security and military officials wield unchecked power over the law.
- ✓ The absence of clear strategies for sustainable development in fishing and the widespread exploitation of phosphate and sand mines without generating added value or fostering a renewable economic cycle.
- ✓ The lack of plans or strategies related to environmental obligations, safety conditions, and the implementation of safe exploitation, with no differentiation between exploited sites in occupied Saharawi territories and Moroccan regions.

While awaiting specialized studies, we will briefly review aspects of the environmental reflections of the exploitation of natural resources in the Saharawi context as examples, but not exclusively:

I – Ground water

Western Sahara is located in a dry, water-scarce region, where there are no rivers and rainfall is characterized by scarcity and fluctuation. Therefore, groundwater remains the main source of water in Western Sahara. Groundwater deep size of reserves has not yet been accurately identified. It is important to emphasize here the modest results of projects implemented to desalinate seawater, which remains expensive due to its large energy needs. Groundwater in occupied Saharawi territories is subjected to devastating depletion processes supervised and benefited by the Moroccan Water Bureau as a Moroccan government institution that controls the extraction, treatment and distribution of water and obtains the proceeds of its extensive exploitation which constitutes a depletion of one of the most important environmental threatening of natural resources of Western Sahara.

¹ United Nations Economic Commission for Europe (2014): Environmental Performance Reviews: Morocco. In cooperation with United Nations Economic Commission for Africa.

Professor Moises Ponce de Leon believes that the extensive Moroccan exploitation of the groundwater of occupied Western Sahara should be seen as a plunder of natural resources of Western Sahara similar to the plunder of phosphate or fishery wealth².

The large scale of groundwater depletion is due to:

1. The urban expansion resulting from the Moroccan occupation brought hundreds of thousands of Moroccan settlers and their settlement in the cities of Western Sahara, whose population increased as a result of Moroccan settlement from 74 thousand people in 1974 to more than 600 thousand people in 2022. This urban expansion has led to a significant increase in water consumption rates, both water intended for human consumption needs and those related to construction and housing projects, which have spread significantly in the framework of enabling and stabilizing Moroccan settlement policies in Western Sahara.
2. Projects of various industrial structures mainly in the vicinity of the cities of El Aaiun, Dakhla and Boujdour, such as cement factories, construction materials, fish canning and freezing plants, fish oil and flour industries etc.
3. There is no doubt that the current level of exploitation of groundwater and the existence of plans to expand agricultural projects near Dakhla, constitute sources of threat and serious depletion of the limited water supply area, will result in an increase in salinity of fresh water and then the scarcity of this water, which will make this dry area with rare rainfall will inevitably face a serious shortage of drinking water in the future.
4. Mineral activity: the processing of phosphate rocks before exporting them from the port of El Aaiun requires enrichment and impurity treatment processes, and large amounts of water are used in these annually, processes.

According to the report of the German Environment Agency, in 2015, the Moroccan phosphate Bureau established a seawater desalination plant, which produces up to 1.5 million cubic meters³ to meet the demand for fresh water after decades of depletion of Saharawi groundwater in its illegal operations aimed at processing and exporting looted Saharawi phosphate to dozens of countries around the world.

It is known that seawater desalination plants have negative effects on the environment, as they consume large amounts of energy and leave harmful waste, such as concentrated saline solutions, which negatively affect the marine environment.

². قباس ردصم، ءهـبـر غـلـا ءار حـصـلـا يـفـ اـيـجـولـورـديـلـاـو ءـاـيـمـلـا لـوـح ءـرـضـاـحـم ،نـوـيـل يـد سـنـوـب سـيـس يـوم رـوس يـفـوـرـب

³ The German Environment Agency, OekoRess II: Country Case Study VI Morocco/Western Sahara: Phosphate (Bou Craa), (2018), P.31.

The Moroccan occupation's efforts to start exploiting the mineral ores in Tuwainat El - ghareg, Glebat Lefhouda and Zemelet Aghrasha, among other projects that require large amounts of water, pose additional sources of threat to the already scarce fresh water, which is exploited without conducting accurate assessment studies of its underground reserves, which opens the future of the region's water security to great risks.

In general, the groundwater reserves in Western Sahara have not been estimated in depth and accurately, and it can be said, within the limits of available information, that they are limited and non-renewable due to the scarcity of rains, which necessitates rational exploitation of the existing ones, which are currently subject to depletion due to urban expansion and increasing industrial, agricultural and mineral activities. It is important to turn to the Seawater desalination as an alternative to the widespread exploitation of groundwater.

II – Fishery

Sahrawi marine wealth has been subjected to extensive depletion operations by foreign fleets, especially European and Asian for decades during the colonial era, and this looting doubled after the Moroccan occupation, which practiced looting the Sahrawi marine wealth by expanding the activity of its naval fleets, issuing licenses for fishing in the Sahrawi territorial waters to foreign fleets belonging to dozens of countries, and this depletion has affected fish, molluscs, crustaceans, sea cucumbers and others.

In addition to the excessive exploitation of biomass in the Saharawi territorial waters, the activities of a number of European vessels on the Saharawi coasts after being banned in their countries due to their age and risks to the environment have been observed. The widespread use of towing vessels, unattended nets, the non-observance of biological rest times, dumping of thousands of tons of fish after being caught at sea, even the use of explosives, illegal, unattended and unauthorized fishing activities are all considered frequent and routine practices on the Saharawi coasts that are not governed by clear legal procedures⁴. All these factors combined with mismanagement, weak management and the expansion of corruption in the marine fishing sector; threaten the sustainability of Sahrawi marine resources and the extinction or scarcity of many marine species.

⁴ In a statement issued by the members of the Professional Association of Fishing Boat Owners on the High Seas in Morocco following their meeting in the city of Agadir on May 10, 2022, they expressed “their fears that the efforts made to ensure the sustainability of fisheries will be harmed, in light of the severe threat to which these fisheries are exposed, due to illegal, unreported and unregulated fishing activities, as is the case today on the southern coast - according to their expression - with their indication of the presence of more than 1,000 illegal boats active in octopus fishing under different names“.

The levels of significant industrial expansion associated with the canning, freezing, fishmeal and fish oil industries, the number of units in the occupied Saharawi cities amounted to about 150 factories, as well as supplying the cities of the fish industries in Morocco with their needs of Saharawi fish. Additionally, the volume of exports, estimated through the activity of 206 export companies in the cities of El Aaiun, Dakhla and Boujdour, and the scale of multinational foreign looting of Saharawi fish resources, are all considered direct indicators of the scale of looting and the catastrophic depletion of Saharawi marine wealth.

Unwanted fish are also discarded or replaced with species of greater commercial value on a large scale, sometimes up to half of the catch, and the amount of organic matter thrown away and disposed of in the case of the Saharawi aquarium is estimated at about 114,000 tons per year, which may have affected food relations⁵.

The looting and depletion of molluscs due to their high market value and the entry of “big whales” into their exploitation activities, this is a topic that needs some stopping at its size and its obvious risks to the sustainability of these Saharawi marine riches and the dire threats to the balance of the Saharawi marine ecosystem, which has been disrupted more than once, a situation that has been repeatedly alerted by specialized authorities at the local, regional and international levels.

The last two decades of the last century and the following have witnessed a huge increase in the volume of Moroccan and foreign depletion of molluscs in the Saharawi coasts, especially in the vicinity of the city of Dakhla, and in light of the struggle of influential Moroccan lobbies supported by foreign capital in order to acquire larger shares of the spoils of Saharawi molluscs due to the high demand for them in the European and Asian markets and their high market value, which opened the door to the struggle of financial forces and influence in Morocco, in which political and financial parties located at the top of the political and financial pyramid in Morocco, starting from the Royal Institution, and since King Mohammed VI is the first shareholder of Omnium)) or Al-zabdi group as well as Generals Abdelaziz Bennani, Abdelhak Kadiri and Hosni Ben Slimane as well as some men of influential families due to their origin and political position during the decolonization of Western Sahara⁶.

A class of Moroccan businessmen has also emerged, whose great activity is to invest in marine fishing, and they control a large percentage of the activities of the marine fishing sector in the occupied Saharawi territories, especially in the Dakhla region, and they are protected and sponsored by the occupying Moroccan Authority, the most prominent of these is Mohammed

⁵ Balguerías, E. 1996. Discards in fisheries from the Eastern Central Atlantic (CECAF Region). FAO Fisheries Report, no. 547, Supplement: 183–214.

⁶ Victoria Veguilla. Conflits et actions collectives autour de l'exploitation du poulpe au Maroc. Politique africaine 2009/4 (N° 116), pp. 43 à 62.

Al-Zabdi, known locally as the king of the pelagic, who is the owner of the Zabdi group, which owns a number of companies, including the company “Golden Fish”, which is one of the largest sardine canning and exporting companies in the world, the beloved known for happy beard, the prominent face in the hunt Octopus trading, the owner of a number of refrigeration units and the owner of a number of companies working in marine fishing in the Dakhla region, such as “golden golf”, “Koza Beach”, Abdul Rahim Al-hibza and his brothers, who are considered one of the largest ship owners and traders of marine fishing products in Dakhla, in addition to Ibrahim Al-batah, Al-qabaj, Alalaj, Al-hamdawi and others.

This conflict involved conglomerates of Moroccan companies that received government support and foreign funding, primarily Chinese and Emirati, in order to invest in Saharawi octopus fishing, among the most prominent of these conglomerates:

– The Professional Association of high seas boat masters in Morocco, known in short as APAPHAM, which was founded in 1978 and includes a mixed Moroccan and Chinese capital, and the total tonnage of each of its vessels is 797 tons on average, all its huge vessels are active in the Saharawi waters between Boujdour and Leguera and includes a modern fleet equipped with the latest fishing and navigation technologies. the Professional Association of high seas boat masters in Morocco represents the interests of a number of companies, such as OMP Ominium Marocain de Pêche group (54 vessels), Marona which affiliated with ONA Group⁷ (40 vessels), the South Atlas fisheries company (20 vessels) and others. These companies with great political and economic influence oriented to octopus fishing, and they have benefited from government subsidies⁸. The number of its vessels active in fishing for Saharawi octopus reached 324 vessels.

– The Arab Maghreb-United Arab Emirates fishing company, known as UMEP (Union Maghreb Émirats Arabs Unis de Pêche), includes a number of environment and small companies dedicated to octopus fishing. It was established in 1989 with joint financing between Morocco and the United Arab Emirates, and the number of its vessels operating in the territorial waters of the Sahara reached 67 vessels. Later the two groups united and formed the Moroccan cephalopod Hunters Association known as ACM.

⁷ ONA group is the largest Moroccan company ever and one of the largest companies in the Arab world, It controls large sectors of the Moroccan economy, such as the milk and dairy products sector, the sugar industry, fishing, real estate, agriculture, communications, oils, mines, and retail, in addition to having an important stake in the largest private bank in Morocco, Attijariwafa Bank. The King Mohammed VI and his royal family own a large share of the company's shares, and the company enjoys preferential treatment in many economic sectors.

⁸ Ismail Azaguagh et Ahmed Driouchi,)2019(: Gestion des ressources halieutiques au Maroc et modes d'accès : Le modèle des «AntiCommons» et la pêche poulpière, Revue Marocaines de Sciences. Agronomiques et Vétérinaires, volume 7 n 1, p 5.

In addition, the activity of foreign vessels directed to the fishing of molluscs, where 150 vessels belonging to the EU countries practiced octopus fishing off the Sahrawi coasts during the nineties after obtaining a license under the maritime fishing agreements between Morocco and the EU.

Due to extensive overfishing and overexploitation of molluscs by Moroccan and European fishermen, “the cephalopod catch increased from only 1,100 tons in 1991 to 88,000 tons in 1999, which led to an alarming decrease in cephalopod stocks, which went from 100,000 tons in 2000 to 8,000 tons in June 2004”⁹.

The scale of this widespread looting is shown by the rocket increase in the number of octopus freezing units in the city of Dakhla, whose number increased from 4 units in 1994 to 94 units in 2004, as well as the increase in the number of fishing vessels on the Moroccan high seas, all of which are active in Saharawi territorial waters, and octopus fishing accounts for 73% of its activity, from 4 vessels in 1973 to 228 in 1984 to 353 in 2020.

This acceleration in the pace of insane looting of molluscs, which peaked in 2000 with the capture of 45,233 tons of octopus, as was announced, soon reflected on the vital stock of molluscs in Western Sahara, so the volume of catch in 2004 fell to the level of only 12,417 tons, this catastrophic situation prompted the Moroccan Institute for research in Marine Fisheries in October 2003 to sound the alarm by announcing a dramatic decrease in the size of molluscs, where announced a sharp decline in the stock of octopus 80% in 2003, which he confirmed again in his report published in 2004¹⁰.

The Moroccan and foreign depletion of molluscs fisheries in Western Sahara led the food and Agriculture Organization of the United Nations (FAO) in 2010 to urgently recommend reducing the overexploitation of molluscs, especially by tugboats in the Dakhla region, which, as mentioned, may lead to the interruption of the life cycle of these precious marine creatures and their extinction.

Similar warnings were issued years after the 2003-2004 disaster by the food and Agriculture Organization of the United Nations (FAO)¹¹ and the organization for Economic Cooperation

⁹ Sandrine, DAVANTURE, «Les limites de l'application du droit sur les ressources naturelles: le cas des territoires palestiniens et du Sahara occidental», mémoire de maîtrise, Université du Québec à Montréal (Dir. René Côté), 2005, p. 69.

¹⁰ INRH (2004). Note relative à l'état du stock du poulpe, Campagne d'évaluation par chalutage du Navire de Recherche Charif Al Idrissi, 2004. Département des Ressources Halieutiques.

¹¹ FAO, (2014). The state of world fisheries and aquaculture, Opportunities and challenges, FAO, Rome 2014.

and Development (OECD)¹², which confirmed in 2014 that most of the Saharawi octopus stocks are under threat due to overexploitation, overfishing and mismanagement.

The Moroccan Institute for research in Marine Fisheries reiterated in its 2016 report that the effects of the 2003 disaster have not recovered the stock of the Saharawi octopus, noting: “the stock of octopus in southern Morocco is characterized by fragility and instability and cannot be rebuilt after a long period of overexploitation, especially the very advanced state of collapse that occurred in 2003¹³.”

The deterioration of the vital stock of molluscs is what prompted the introduction of the so-called “reconfiguration of molluscs traps” scheme. It is clear that this scheme has yielded little results due to the chaos and nepotism that governs this sector, with the spread of false data on fishing quantities, smuggling, as well as the practice of octopus fishing at biological rest times, as witnessed by hundreds of trucks transporting octopus from the occupied Saharawi cities to Morocco, as well as the use of rubber tires, unlicensed boats and other methods of circumvention and circumvention of the already fragile procedures.

Large-scale fishing, indiscriminate fishing and overexploitation of molluscs stocks in the Saharawi marine basin have known the rise again; the octopus catch has increased from 10,000 tons in 2004 to 55,000 tons in 2018¹⁴, threatening the biomass with an inevitable environmental catastrophe.

In June 28, 2022 the report published by the Moroccan Institute for research in Marine Fisheries alerted to the new environmental disaster that has hit the stock of the Saharawi octopus based on the results of the monitoring campaign conducted by his teams between March 24 and April 3. In 2022, the alarm was raised again about the catastrophic situation of the octopus’s sharp decline reached in the area between Boujdour and Leguera, which decreased by 60% compared to the same period in 2021¹⁵, and the report shows that “the severity of the recorded collapse can only be explained by excessive and systematic exploitation that destroys the capabilities of replenishing the fish stock itself, as the study associated with the scientific indicators of the status of Excessive as a result of non-compliance with the measures and procedures adopted by the rotation trap, foremost of which are periods of biological rest, reproduction”.

¹² OCDE (2014). Utilisation des ressources halieutiques, dans *Panorama de l’environnement 2013: Les indicateurs de l’OCDE*, Éditions OCDE.

¹³ Ismail Azaguagh and Ahmed Driouchi, 2019. Previously mentioned source, p. 7.

¹⁴ This is how the “Halieutis” plan increased the production and exports of marine fishing, Al-Akhbar Press, September 16, 2019.

¹⁵ The report of the Moroccan Institute for Research in Marine Fisheries in December 2022 raises this percentage to 82%.

In light of this catastrophic situation, the Moroccan Institute for research in Marine Fisheries confirms in its report that “the lack of respect for breeding and biological rest periods, the continuation of overfishing activity and depletion has led to an unprecedented critical situation, the catastrophe that had befallen the southern fisheries years ago will be reborn, if the custodian administration does not take urgent and immediate measures, such as, managing octopus fishing on the principle of fishing within the limits of biological productivity levels and stock replenishment levels, reducing the mortality rate (fishing volume) through the management of fishing effort (number of fishing fleet, fishing mechanisms, fishing duration...etc.) and also the determination of quotas granted to octopus fishing sectors (cotta).

It should be emphasized that the fact that octopus is not the only marine wealth at risk due to overexploitation, chaotic and uncontrolled fishing, but there are many marine species threatened with extinction from the territorial waters of the Sahara, the Supreme Council of accounts, a Moroccan regulatory body, in its report on the marine fishing sector, through its evaluation of what is known as the “Halieutis Plan” for the period 2009-2020, indicating the need to “adopt a voluntary program to rebuild stocks for species that are in a state of overexploitation, such as pink shrimp, white hake, sea bream, bream, Corbin, sea bass, and gray sea bream in the Atlantic Ocean”.¹⁶

In addition to the depletion of Fish and molluscs, some fishing methods practiced on the Saharawi coasts with traditional equipment contribute to environmental pollution and the destruction of the marine environment “each traditional fishing boat uses more than 800 plastic bottles in the sea on each fishing trip, monitoring the rate of loss of these bottles by 36% to 58%, which leads to an approximate figure of up to 1.5 million bottles lost at sea every year, turning the bottles into ghost traps that increase the exposure of female octopuses to death more namely, plastic bottles are worrying sources of pollution,» says the report of the Moroccan Institute for research in Marine Fisheries (June 2022), moreover, the «Targeting small sizes using illegal nets, with narrow eyes increases the percentage of octopus fry thrown into the sea, and from other fish species, and this also has a reflection on the marine environment, and on the decline in the percentage of oxygen in the water,» says the same report, and all this contributes to the degradation of biomass.

The devastating environmental effects of large-scale industrial activity associated with the exploitation of marine wealth in the occupied Saharawi territories is another manifestation of the dangers of the frightening exploitation of Saharawi marine resources, for example, the production of one ton of fishmeal requires about 5 tons of fresh fish.

The impact of such a large-scale exploitation of the Saharawi marine wealth-only through overfishing by Moroccan fishermen who practiced a large and continuous crawl on the Saharawi

¹⁶ <https://lakome2.com/decryptage/134269/>

coasts after the depletion of the wealth of the Moroccan coasts or through intensive foreign fishing – Including the catch directed for industrial purposes such as canning, freezing, flour, fish oil industries and others in the occupied Saharawi territories (149 industrial units in the cities of El Aaiun, Dakhla and Boujdour) or directed to the numerous factories in Moroccan cities, especially Safi and Agadir, as well as its direct effects on the regeneration of the biomass of the Saharawi Marine Area, which the food and Agriculture Organization of the United Nations has warned more than one location, for example, fishmeal odors cause respiratory diseases Such as asthma, respiratory infections, allergic rhinitis, eyes, skin eczema infections, diseases of the stomach, intestines, pharynx and others.

In addition to the extensive exploitation of water and energy sources in these industries, their risks to the environment and human health represent deep concerns, especially in light of poor compliance with safety conditions, low environmental culture, lack of interest in waste treatment with modern technical methods, the absence of control, the spread of corruption and nepotism and weak management in this sector.

III – Phosphates

The high environmental risks of extracting phosphate from the Bu Craa mine-despite the lack of accurate data on the environmental effects of this mineral activity - can be confirmed by comparison with similar cases that have been documented as ecological disasters in phosphate mining areas, as in the case of Rusaifa in Jordan and the Tunisian mining basin area, especially in Redif and Gafsa in western Tunisia, in addition to Jorf Lasfar, Youssoufia and Safi in Morocco, which are areas where extensive contamination with phosphate substances has been documented through specialized studies.

Despite the lack of a comprehensive assessment of the environmental impacts on mining activities at the Bu Craa mine in detail, with the exception of a study conducted by the German Environment Agency in 2018, it is certain that the extensive mining activities known in the Bu Craa area and its surroundings for decades, and in the absence of a real environmental safety rules in the activity of the company exploiting the mine, leave contaminated in phosphate rocks, in addition to phosphates, these rocks contain cadmium, fluorine, lead, uranium, thorium, chlorine, vanadium, chromium, phosphate gypsum and others.

These harmful effects, the risks of which extend to humans, animals, plants, marine life, soil, microbiology and others, can be summarized in the following points:

1. Destruction and disruption of the ecosystem:

The Bu Craa mine is exploited by Surface Mining, which covers a large area that has doubled over time This extensive exploitation of the Earth's surface containing phosphate ores led to

a change in the natural environment, damage to landscapes and ecosystems through drilling, extraction and transportation of phosphates, uprooting the soil, removing the already limited vegetation cover, and the creation of mineral Hills on the Earth's surface, which negatively reflected on the local ecosystem, whose components were subjected to destruction and change in its geographical and morphological structure, as well as in its chemical composition through the formation of abnormally high concentrations of some minerals associated with the extraction of phosphates, which destructively affect various components of the fragile local ecosystem, existing in difficult Saharawi conditions.

These facts are supported by the report of the German Environment Agency when it says: "phosphate mining in general and in Bu Craa in particular leads to a change in land use and affects the aesthetic landscape. The landscape is disturbed by" the removal of vegetation, the removal of topsoil, the digging of overloads and ore, the construction of dense dumps, moreover, the processing plants in the eyes occupy space along the coast"¹⁷ which, in addition to all this, represents visual pollution.

"Mining activities have expanded since 1984 to cover an area of 23,100 hectares (231 square kilometers) and global phosphate demand is not expected to decrease, so it can be assumed that the Bu Craa mine will continue to expand in the future"¹⁸ the report adds.

2. Air pollution

Significant amounts of dust and dust are released as a result of drilling and transportation operations associated with phosphate extraction activities in the Bu Craa area. These dusts, which spread around the mine site and along the phosphate conveyor belt from Bu Craa to the port and at the shipping and processing site on the Atlantic coast, contain some heavy elements and some metal components that pollute the air significantly, such as cadmium, fluorine, uranium and phosphate gypsum.

Since the Bu Craa mine, which is open on a large area, is located in an area known for its permanent sandstorms that transport dust over large distances, these pollutants resulting from the extraction of phosphates are able to move to large areas, forming a source of serious air pollution not only in the vicinity of the mine and the town of Bu Craa, but throughout the Western Sahara region, especially that the Bu Craa mine is in the middle of three of its main population centers, as it is located only 97 kilometers from the city of El Aaiun, 125 kilometers from Samara and 163 kilometers from Boujdour, and the effects of this pollution can extend to the regional neighborhood for the western Saharawi, as the numerous aerial photographs that

¹⁷ The German Environment Agency, *OekoRess II: Country Case Study VI Morocco/Western Sahara: Phosphate (Bou Craa)*, (2018), P.27.

¹⁸ *Ibid.* p27.

have monitored the arrival of the sandstorm load show Saharawi to the Canary Islands, Europe and even South America and the Caribbean region.¹⁹

The report of the German Environmental Authority lists the causes of air pollution resulting from the exploitation activities of the Bu Craa mine, both at the mine site in the town of Bu Craa and in the port of El Aaiun, such as weight Removal Operations, extraction of phosphate rocks themselves, the movement of mining machinery on unpaved roads, dry sorting at the mine site, transportation through the conveyor belt, enrichment, drying and loading on ships, in addition, satellite images show the scattering of phosphate and accompanying minerals along the conveyor belt, which is about 100 kilometers long, which doubles the area of pollution, and increases the likelihood of transported by wind erosion and spreading in the surrounding environment .

3. Water pollution

Although the Bu Craa mine is located in a dry area with little rainfall, the rains in this area occur in the form of devastating floods in some years²⁰, which raises the risks of water pollution carried by the valleys of the area, which are part of the hydrological network of the Saguia El-Hamra basin, as these valleys drain into the Saguia El-Hamra valley, which represents the most important watercourses that feed the delta of the valley) Foum Elouad(, which is an important source of fresh water, and also threatens the deposition of heavy metals and dangerous radioactive metals in surface water stored at the level of the El Aaiun dam and in groundwater, which is the main source of drinking water, irrigation and livestock watering in the area, which may lead to the emergence of High toxicity in drinking water and in food.

These heavy metals and radioactive elements associated with phosphates can also pollute the seawater in which the flow of the waters of the Saguia El-Hamra valley ends, which will inevitably affect the ecological balance in the marine environment, as will be seen in the following paragraphs.

4. Soil and plant pollution

The extensive and unsafe extractive activity of Bu Craa phosphate in its various stages leads to an increase in the concentration of dangerous mineral elements in the soil, which leads to

¹⁹ The amount of phosphorus reaching the Amazon soil from the Sahara is estimated at 22 thousand tons annually, according to the article below: Cook, T. (2015), Amazon rainforests fueled by African dust, EOS, 96, doi:10.1029/2015EO031649. Posted on June 22, 2015.

²⁰ An example of this is what happened in November 1947, which is known locally as the year of “death of the Lebsser family,” when the flood of Bou craa valley led to the death of eleven members of the same family.

a disruption of its chemical composition, which negatively affects its fertility and the vital balance of the microorganisms that inhabit it, and the accumulation of harmful mineral elements and their deposition in the soil, whether by wind or by water, causes pollution risks leading to the loss of natural pastures or pollution of their plants in a way that reflects on animal and human health in a region where pastoral activity is still one of its most prominent features.

5. Pollution of the marine environment

The transportation and accumulation of phosphate rocks in the open in large quantities in the AL-Mersi area (phosphate export port), in addition to the dust and dust resulting from transportation and shipping, as well as dry processing of rocks through crushing, sorting, screening or treatment by immersion and rinsing by water in the absence of a scientific method of treating waste disposed of by emptying into the Sea directly are considered serious pollution factors that threaten the neighboring marine environment.

The deposition of various mineral elements associated with phosphates changes the marine chemical environment and pollutes it with some dangerous elements such as cadmium²¹, lead, uranium, fluorine and others that are deposited in the bodies of marine fauna and concentrate toxic substances in fish, molluscs, shellfish and other marine resources of economic value.

The melting of phosphates in marine waters also changes the pH of the water, turning it into alkali, which affects marine life, as well as increasing the growth of harmful algae because phosphorus compounds are considered plant nutrients and lead to significant algae growth, leading to environmental hazards, such as high rates of substances that poison marine life and lack of oxygen in the water.

These multiple risks, as well as health risks, are factors that threaten the marine diversity and biological richness of the Marine Area of Western Sahara, which is known as one of the richest areas in the world with its marine wealth.

A study conducted in 2006 by the Moroccan Institute for research in Marine Fisheries confirmed the presence of significant cadmium contamination in oysters around the discharge points of the residues of the Bu Craa phosphate processing carried out by the company affiliated to the Moroccan phosphate Bureau²².

²¹ The percentage of cadmium in Bu Craa phosphate rocks is 35 mg per kilogram.

²² The German Environment Agency, OekoRess II: Country Case Study P.29.

Studies conducted in the Safi and Jorf Lasfar areas in Morocco have also shown that industrial effluents discharged into the sea are contaminated with uranium (0.27 to 0.45 mg / L) and this uranium comes from phosphate gypsum²³.

6. Radioactive contamination

Phosphate contains radioactive metals such as uranium and thorium, and the percentage of uranium in Bu Craa phosphate reaches about 200 grams per ton²⁴ exposure to these substances leads to the risks of radioactive contamination, which has a devastating effect on human, animal and marine health, as it causes the destruction of living cells and causing distortions in their structure, as well as leads to cancer, heart and kidney disease, infertility, fetal death and malformation, and others.

It is noted that «it is very likely that the risks of radioactive substances in the eyes will increase as Fosbucraa expands its production. The reason for this is the presence of phosphate gypsum, a by-product of radioactive waste generated during the production of fertilizers; phosphate gypsum contains noticeable amounts of uranium and its products that are concentrated during the production of fertilizers»²⁵.

The accumulation of phosphate rock mounds, the discharge of waste from their processing, transportation and spread into the ocean are sources of radioactive pollution dangerous to the health of direct workers, local residents, the environment and the ocean with its various components.

7. Risks related to human health:

Pollutants resulting from the exploitation of phosphates pose many risks to human health, as exposure to harmful elements emitted by phosphate mining processes leads to a number of diseases, both those resulting from air pollution and(or) water pollution, such as respiratory diseases, allergies, poisoning, cancer, cardiac diseases, infertility, kidney failure, tooth decay and darkening due to the concentration of fluorine in their structure, osteoporosis and fragility, diseases of joints and muscles, premature skin aging, atherosclerosis and an increased likelihood of heart attack or stroke ...etc.

In the absence of field studies on the serious impact of the exploitation of Bu Craa phosphate on workers in light of low occupational safety measures and on the local population and residents of other areas affected by the impact of harmful minerals associated with phosphate,

²³ https://voir-et-agir.ch/content/uploads/2019/02/summary_morocco.pdf, p.6.

²⁴ DIERCKE 1981, Weltwirtschaftsatlas I, München, p.55.

²⁵ The German Environment Agency, OekoRess II: Country Case Study, p 30.

the results of studies conducted on phosphate in Moroccan mines that share with the Bu Craa mine in their chronological age and chemical characteristics, because they all belong to the phosphate basins of northwest Africa, where “Greenpeace and the World Nuclear Association found that Moroccan phosphate contains a high content of cadmium and significant amounts of uranium, which are heavy metals associated with cancer, kidney failure and bone diseases”²⁶.

A research report by a scientific team from Switzerland that conducted a field study on the sites of activities of companies affiliated to the Moroccan Bureau of phosphates in the city of Safi and in the area of Jorf Lasfar in February and March 2019 revealed high pollution rates in the air, water and agricultural soil and the significant impact of phosphate extraction activities and fertilizer production on the health of workers and the local population, which represents a violation of human rights, as the research team says that “the production of phosphate fertilizers in Morocco violates the right of workers and neighboring communities to health and has a negative impact on the environment, as many workers suffer from respiratory diseases and cancers due to exposure to pollutants and fine dust, experts emphasized That many cases of worker deaths have been announced as a result of these diseases, in addition, “the local population also suffers from pollution”²⁷

The report of the German Environment Agency notes that “the health risks caused by dust (in the processing area of the port of El Aaiun) are similar to those in the mines and will grow stronger in the future as Fosbucraa plans to expand its activities to include the production of phosphoric acid and Fertilizers. The production of sulfuric acid, phosphoric acid and ammonia gases can affect the health of workers during the chemical preparation of phosphates, or through the production of fertilizers via the release of dust, phosphate, fluorine, cadmium, uranium and phosphate gypsum, all of which can cause health problems”²⁸.

In addition, there are health risks to human health resulting from the consumption of plant and animal food, including marine products, contaminated with phosphate compounds or harmful mineral substances resulting from the exploitation of phosphate rocks.

IV – The sand

Sand is depleted in the Saharawi territories occupied since the Spanish colonial period. Sand is the second oldest wealth being depleted in Western Sahara after fish wealth. Sand began to be shipped from Western Sahara to Spain in 1955. The frequency of this depletion increased

²⁶ <https://www.theguardian.com/global-development/2015/dec/16/toxic-shadow-phosphate-miners-morocco-fear-they-pay-high-price>.

²⁷ https://voir-et-agir.ch/content/uploads/2019/02/summary_morocco.pdf

²⁸ The German Environment Agency, OekoRess II: Country Case Study, P.38.

under the Moroccan occupation. Sand is widely shipped from the port of El Aaiun to Spain and the Cape Verde Islands. The process of sand extraction is concentrated in the coastal area near the port of El Aaiun in order to reduce the cost of Transportation.

The process of uprooting and exporting sand in large quantities has devastating effects on the environment as the removal of part of the local ecosystem, which is home to some living species of plants, animals and microorganisms, and this leads to an imbalance in the ecosystem as a whole, and the depletion of beach sand and coastal dunes threatens the neighboring marine ecosystem, which affects and is affected by the coastal environment.

The removal of sand also leads to the fragility of the soil surface, its dryness and low fertility with the subsequent degradation of the environmental environment and the threat of its vital components, in addition, the removal of sand results in known risks to groundwater, because sand stores large amounts of water and leaks into the ground, which allows the supply of groundwater reservoirs continuously, and reduces the percentage of loss by maintaining moisture and reducing evaporation.

The continuous removal of sand at high rates from the marina area and the mouth of the Valley coastal area is a threat to the aquifer of the mouth of the valley, as it leads to the advance of the sea towards the land, which will cause an increase in the salinity of groundwater in this important aquifer.

In general, the current widespread exploitation of Saharawi sands will lead to a change in the fragile Saharawi ecosystem, threaten water resources and components of the marine environment, and many living creatures will lose their natural habitats, leading to an ecological imbalance, which will have profound negative repercussions on man and his natural surroundings.

V – The Moroccan military wall and environmental pollution

The Moroccan defensive wall, which stretches from the southeast of Morocco across the territory of the Western Sahara from North to South at a distance of 2,720 kilometers, represents the largest modern military facility on Earth, and is considered the longest military wall in history after the Great Wall of China, and was constructed with the help of experts from Israel, the apartheid regime in South Africa, France, Portugal and South Korea.

This wall is related to the looting of the Sahrawi natural resources, as it was erected in its first phase (August 1980-June 1982) around the area that the Moroccan occupation then called the “beneficial triangle”, which includes the cities of El Aaiun, Samara and Boujdour, including the Bu Craa mine, which was the target of a number of operations of the Sahrawi

people's Liberation Army, and its most recent expansion was carried out in EL Guerguarat area (November 2020) in order to ensure the flow of looted Moroccan and Sahrawi goods towards West African countries through Mauritania through the illegal loophole the Moroccan occupation occurred near the Sahrawi – Mauritanian border.

Due to the fortifications erected on both sides of the Moroccan military wall protecting the activities of looting and exploitation of the natural resources of the Sahara, Western Sahara is one of the most polluted areas of the world with anti-personnel mines and mechanisms, with more than seven million mines “distributed among 72 types of Mines manufactured in 14 countries, more than three types of cluster bombs and about 100 types of various unexploded ordnance”, says Aziz Haidar, president of the Sahrawi Mine Action Association²⁹, whose association counted more than 500 victims of these extremely dangerous pollutants.

The Moroccan occupation forces have also cut down and removed large of the Western Sahara's trees, especially Talah(*Acacia tortilis*), Ettamat(*Acacia ehrenbergiana*), Ejdari(*Rhus tripartita*), Ignin(*Capparis decidua*) and Tarfa(*Tamarix arabica*), wherever they are found along the Moroccan wall, so as not to be used as barriers by Sahrawi fighters, in these cases the trees are removed in such a way that it is impossible for them to grow again while maintaining the lower part close to the ground to be an obstacle to the movement of Sahrawi vehicles, which the soldiers fear the moors attacked her.

The final removal and felling of these slow-growing perennial trees over large areas is certainly a terrible destruction of the natural habitat of many species of living creatures and irreparable destruction of the fragile Saharawi ecosystem.

²⁹ <https://www.spsrasd.info/news/ar/articles/2023/04/04/44924.html>