

# Limitations of Libyan sustainable development in oil production and consequences of such policy on fisheries

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**Abstract-** Libyan present political, economic, and environmental context as a whole is very complex for making any progress when it comes to any of these socio-political areas. The reason is, above all, security instability. Then, the complete division on the political scene. Likewise, the internal structure is fragile when it comes to institutions. Furthermore, corruption is present in all pores of the socio-political sphere. An additional problem with this is the drastic decline in trust in the functionality of institutions.

When speaking about education as one of the most important factors of the social component of sustainable development, it is important to point out that primary education in Libya is compulsory. Likewise, public education is free. Namely, Libya has been focused on education since the time of the former political regime, expecting a lot in return from future generations. However, as a result of the war, young people began to go in large numbers to educational centers around the world, seeking education and knowledge. Elementary education is compulsory (it consists of nine grades, and the last three are preparation for further). Until recently, significant state incentives were provided for all who were determined to study. However, with the beginning of the war, the situation visibly complicated. However, the state has not given up yet, but, understandably, rather irregular payments are more scholarships. So, if we start from the fact that education is a factor in the social component of sustainable development, then we can repeat the assessment that in this segment the Libyan context is uncertain and complex, viewed from the current socio-political angle.

**Index Terms-** oil reserves, pollution, waste management, tuna fishing,

## I. INTRODUCTION

The Libyan state is one of the countries with the largest oil reserves, among African countries. It is crucial that its oil is the so-called "Sweet" oil, ie a raw material that contains a very low percentage of impurities, and this is in great demand. It is estimated that the total state reserves are some 3.4 percent of the total international reserves (or 46 billion oil barrels). This data

ranks Libya in ninth place in the world in terms of estimated oil reserves. However, the events of the war caused the oil production to decline drastically with the fall of the previous authorities, and constant civil conflicts, which created an unstable socio-political context. The average daily production in 2016 was 332,000 oil barrels. And yet: "oil does not cease to be key to the growth of the Libyan economy."<sup>1</sup>

So, to be precise, the conflicts in Libya started because of resources, more precisely because of oil. These were initially conflicts between tribes (Tebu and Tuareg in the Ubari area). This was an even bigger problem, because these tribes were divided among themselves, based on political affiliation. While some were in favor, the others were against the then government (members of the Tuareg were in favor, and members of the Tebu tribe were against). Thus, the influences of those forces, which were outside the borders of the country and tried to reach the oil sources, refracted through them. Due to great political instability, economic progress has slowed down, more precisely, a large decline has been registered since the beginning of the conflict in 2011 (specifically in 2012, Libya ranks last in the neighborhood in terms of economic indicators). This atmosphere negatively affects any economic shift, despite the fact that there is great economic potential in the oil sector.

Solid waste or post-conflict waste management, although still unregulated as an area, would involve the collection, transportation, processing and disposal of waste in landfills. This only does not apply to hazardous waste.

## II. POLLUTION AND WASTE MANAGEMENT

Libya is a country that is also struggling with large-scale pollution of its waters, and above all its coastline. There are numerous factories (such as petrochemicals in Libya), whose wastewater is polluting, as evidenced by surface sediment analyzes (full of Hg and As, and the same are of anthropogenic origin). These are valuable data, due to the fact that there are no continuous monitoring, which makes it difficult to see the overall extent of environmental pollution in Libya.<sup>2</sup>

It is a big problem is that Libya, as a state, has not established a monopoly when it comes to the repressive apparatus, which is

<sup>1</sup> YCharts. (2016). Libya crude oil production. (Monthly, Barrels per Day) - YCharts. Available at: [https://ycharts.com/indicators/libya\\_crude\\_oil\\_production](https://ycharts.com/indicators/libya_crude_oil_production) (Accessed on April 26<sup>th</sup> 2020.)

<sup>2</sup> Banana, A., A.S., Radin, M., R.M.S., Al-Gheethi, A.A.S. (2016). Mercury pollution of marina environment at Farwa island of Libya. Journal of Environment, Health Science and Emergency. Vol. 14. p. 39

also the reason for many, for such a chaotic situation - which ultimately refers to the institutional component of sustainable development. There is a lack of control and function of the state on the ground, there are many paramilitary formations on the ground whose actions can be deciphered in accordance with the explained goals and aspirations, with the local domicile population being the most affected, which the ruthless forces use for mutual calculations. In this way, "countless columns of internally displaced persons (about a million of them) are created, without protection from shelters, electricity, water, and children do not go to school, so they do not even have basic humanitarian aid, without which survival is impossible," mentioned the situation is certainly in essence contrary to the concept and what sustainable development represents.

The big Libyan problem is that Libya, as a state, has not established a monopoly when it comes to the repressive apparatus, which is also the reason for many, for such a chaotic situation - which ultimately refers to the institutional component of sustainable development. There is a lack of control and function of the state on the ground, there are many paramilitary formations on the ground whose actions can be deciphered in accordance with the explained goals and aspirations, with the local domicile population being the most affected, which the ruthless forces use for mutual calculations. In this way, "countless columns of internally displaced persons (about a million of them) are created, without protection from shelters, electricity, water, and children do not go to school, so they do not even have basic humanitarian aid, without which survival is impossible,"<sup>3</sup> mentioned the situation is certainly in essence contrary to the concept and what sustainable development represents.

### III. FACTORS THAT AFFECT POLLUTION

Due to such complex conditions, there is no human rights law in Libya, within the framework of the legislation. Consciously, as a secondary, democratization is pushed into the background, and the same applies to laws related to the field of sustainable development.

Progress is difficult to achieve in any direction, within the socio-political field. Unfortunately, we can state that the damage caused to Libya's infrastructure is innumerable, and the question is with whose money and for how long it will be possible to restore only one part of it, while some parts may not be able to return to their original condition. , regardless of investments in this direction. Of course, foreign investors are already fighting for their participation in such profitable ventures, which is why they are lobbying a lot with selected centers of power, for their

participation and investment. Let's not forget to draw attention to the numerous devastations of higher education institutions (universities), but also schools, laboratories and libraries (there is still no record of the extent of devastation of these facilities), which is one of the reasons for the wave of emigration of teachers and students. Unfortunately, foreign investors have an advantage here as well, both phenomena suit them, because space is opened for their investments, and for obtaining, without invested funds, a huge number of excellent lecturers and quality, promising future students in which Libya has invested.

Numerous factories (like petrochemicals in Libya) also pollute with their wastewater, and sporadic analyzes of surface sediment are also performed there. By finding: "traces of metal, found in the fish stock, warn of the possible danger faced by the local population."<sup>4</sup> Found pollutants (heavy metal ions) do not dissolve in water, but settle and cause pollution for all consumers: " through sediments they enter the food chain. <sup>5</sup> "As such:" they cause chronic diseases and acute illnesses. <sup>6</sup> "Fish are important for nutrition. However, when fish tissue accumulates metals in concentrations that exceed the permitted limits, toxic metals that reach the human body by consumption cause various forms of disease, primarily carcinogenic and mutagenic in nature.<sup>7</sup> Namely, the toxicity of heavy metals can lead to damage or reduced central nervous functions, as well as diseases of the lungs, kidneys, liver and other vital organs. Furthermore, long-term exposure to heavy metals that find their way into the human body through consumption of fish tissue can result in "progression" in addition to the above and muscular dystrophy, multiple sclerosis, and Alzheimer's and Parkinson's disease.

We can say that most of the countries, which are involved in oil production, were forced to face the mentioned ecological catastrophes, while the waste itself, during the production, is taken for granted. The most common cases were oil spills. Thus, in one of the cases, which occurred in Libya, it was drastic in terms of consequences for the environment itself (an oil spill 800 km from the city of Tripoli, which occurred on August 1, 1980, during which as many as 48,800,000 oil spills gallons). It is important to state that in the process of oil production, water is pumped to the surface from the reservoir, with smaller traces of oil. Recent research has revealed a wide range of spatial impacts on the marine environment: "waters released during oil production, which also have a huge impact on fisheries."<sup>8</sup>

### IV. FISHING AND STATE PROBLEMS WITH POLLUTION

As we have clarified what problems Libya is facing, we will pay attention to the problem of water resources, such as problems

<sup>3</sup> Ashour, O., (2012). *Libyan Islamists Unpacked: Rise, Transformation and Future*, Brookings Institution. Doha. p.12

<sup>4</sup> Banana, A., A.S., Radin, M., R.M.S., Al-Gheethi, A.A.S. (2016). Mercury pollution of marina environment at Farwa island of Libya. *Journal of Environment, Health Science and Emergency*. Vol. 14. p. 39

<sup>5</sup> Alhas, E., Oymak Ahmet, S., & Karadede Akın, H. (2009). Heavy metal concentrations in two barb *Barbus xanthopterus* and *Barbus rajonurum mystaceus*. *Environmental Monitoring Assessment*, Vol. 148, p.16

<sup>6</sup> Alhas, E., Oymak Ahmet, S., & Karadede Akın, H. (2009).

Heavy metal concentrations in two barb *Barbus xanthopterus* and *Barbus rajonurum mystaceus*. *Environmental Monitoring Assessment*, Vol. 148, p. 13

<sup>7</sup> International Agency for Research on Cancer (2009). A review of human carcinogens: Metals, arsenic, dust and fibres. *The Lancet Oncology*. p. 453-454.

<sup>8</sup> Washburn, L. Stone, S. & MacIntyre, S. (1999) Dispersion of produced water in a costal environment and its biological implications. *Continental Shelf Research*. Vol.19 No. 1. p. 59

with seawater contaminated by factory wastewater, which is a consequence of the process of industrial production (oil refining), and water contamination by various chemical materials, and this is also an important problem for both the population of Libya and its fishing industry. The mentioned problems, and according to the results of studies performed in laboratories, revealed that the exposure to oil and its traces, caused significant deformities in the case of the development of tuna heart (*Thunnus thynnus*).<sup>9</sup>

Considering that oil production is carried out both at sea and in the coast, and that it has a tendency to grow, and this increases the risk of large-scale contamination. Also, in the process of oil refining, the elements obtained by burning oil (Se, As, Hg) can be absorbed, thus getting rid of the compounds through the flue gases and contaminating the wastewater. Regardless of their physical state and shape, these are elements that are problematic in themselves and when found in crude oil, because they are not only a threat to the environment, but are able to: "damage equipment and affect the performance of catalysts during refining, and thus impair the quality of the final product."<sup>10</sup> When specifically (Hg) is absorbed in the environment, through living organisms (fish), it is transformed into even more drastic forms (primarily C<sub>2</sub>H<sub>5</sub>Hg, CH<sub>3</sub>Hg), and reaches an even higher degree of contamination, affecting the increase in concentration in the food chain. During consumption, the mentioned forms, which are very toxic, accumulate inside the consumer's organism (brain, muscles, liver).<sup>11</sup>

Tuna (*Thunnus Thynnus*) is a pelagic, large fish, with very migratory behaviors, namely: "it is thought to migrate every year from the Atlantic to the Strait of Gibraltar, all the way to the Mediterranean, and spawn there."<sup>12</sup> Its migration route is along the African coast (Libya, Tunisia, Algeria, Morocco), which refers to mature and large specimens of this fish. In Libya, the fishing season usually starts in mid-May, and that refers to long-line mooring boats, while it is only at the end that it is time to fish with traps, at the end of May, until the middle of July.

The ommitment is great, in the direction of closely monitoring all tuna farming activities in Mediterranean waters from the very beginning, and especially from the period of expansion of this industrial activity, which as a factor badly affected the management of already questionable tuna stocks. Thanks to such monitoring, all warnings and facts, which the World Wide Fund for Nature (WWF) has warned about for the last 5 years, have been confirmed as reliable, especially those related to poaching on the African and Mediterranean coasts (Libya, Tunisia, Algeria, Morocco), thus, the conclusion is that the existing consensus in terms of establishing sustainable growth of fisheries in the area: "The Mediterranean has experienced a complete failure."<sup>13</sup>

Almost all of Libya's catch is sold and consumed while it is fresh, along large urban markets, except for a very small part (pelagic), which is set aside for canning during production, ie for the needs of the domestic market (and less for export), but also in the form of fishmeal. Libya has seven factories for the purpose of canning fish, and all of them are still in the hands of the state and are able to process tuna, with the help of a solid daily capacity (for raw materials of 85 tons and fish flour, in the amount of 130 tons). However, all these plants are working in great difficulties, and when it comes to the supply of raw materials, and the poor condition of the available equipment.

All exports are going to Japan, and are exported annually (about 1000 tons of bluefin tuna, as much as is exported to the international market annually) and in smaller quantities to Tunisia, where this type of fish has a very high value. However, when it comes to the fisheries sector, then there is a very low level of employment of the total national labor force (only 1%). It is estimated that fisheries contribute to agricultural GDP at 9 percent (9%). Analyzing data related to tuna catch (*Thunnus Thynnus*), if we keep in mind that employment in the fisheries sector is very low in Libya, with only 1% of the total national labor force, and that the contribution of the same sector to agricultural GDP is about 9%, and if we take into account that the total length of the coast in Libya is about 1770 km, making it the longest among all African countries (Mediterranean), with the average annual consumption of fish in Libya is 9.5 kilograms, then it is surprising more worrying is the fact that tuna catches in Libya are among the lowest, compared to all North African countries, in relation to the position of the Libyan state and the length of its coast. The comparative analysis clearly shows that over time (2004, 2005, 2006, 2007, 2008, 2009), in Libya, the catch of this species of fish was the lowest, among these Mediterranean countries.

We will list the existing reasons for that: a) environmental problems, which are mostly caused by the oil industry, directly affect the toxicity of the marine environment, and thus the health of the fish stock. At the same time, the noteworthy data refers to another species of fish that is globally known as an article that can "feed" Africa, because fish is a source of food rich in protein. Namely, the daily need for protein for women is 30-56 g, depending on body weight and age. During pregnancy and breastfeeding, an additional 6 g / day and 17.5 g / day of protein are mandatory and children's requirements are about 1.5-2.5 times higher in body weight than in adults. Fresh fish, as well as other foods of animal origin, contain higher proportions of protein, about 14-20 g / 100 g. In other words, fish is one of the most effective sources of protein.

It can be said that so far no country, which has focused on oil production, has managed to avoid environmental catastrophes, and especially the problem of oil spills. It is a problem that

<sup>9</sup> Bonsignorea, M. Salvagio Mantaa, Al-Tayeb Sharifa, D.E.A. D'Agostino, F. Trainaa, A. Quincia, E.M. Giaramitaa, L. Monastero. M, (2018). Marine pollution in the Libyan coastal area: Environmental and riskassessment. p. 340–352

<sup>10</sup> Wilhelm, S.M. Liang, Kirchgessner, D. (2006). Identification and properties of mercury species in crude oil Energy Fuel, Vol. 20, p. 182.

<sup>11</sup> Li, Ping; Feng, Xinbin; Qiu, Guangle. ( 2010). "Methylmercury Exposure and Health Effects from Rice and

Fish Consumption: A Review." *Int. J. Environ. Res. Public Health* Vol. 7, no. 6, p.2667.

<sup>12</sup> Mather, F.J., Mason, J.M. Jr, Jones A.C. (1995). Life History and Fisheries of Atlantic Bluefin Tuna. NOAA Technical Memorandum, p. 165.

<sup>13</sup> WWF (2006). The plunder of bluefin tuna in the Mediterranean and East Atlantic in 2004 and 2005. WWF-World Wide Fund for Nature, p.4.

permanently disrupts the ecosystem. The analysis of the subject matter so far, therefore, points out a number of problems that the state of Libya is facing, both on the political level in the form of political divisions, and also on the economic level, within the framework of finance. There are two governments that exercise power, in divided parts of the territory of Libya, and manage with separate ministries of finance, and that is an obstacle for the introduction of a common monetary policy program, on the entire territory of the state.

#### V. INVESTMENTS THAT CAN HELP

Therefore, there are complications in the field of public finances due to continuous turbulence, which in various ways and in different periods of time, very badly affect the overall situation (political conflicts, dizzying fall in oil prices, and its production). The state is facing political divisions, as well as divisions in the field of finance. In addition to these negative trends, related to oil, there is also the issue of debt, which increased drastically. Since the monopoly economy in Libya suits the militarists as well, but lawlessness also suits them, because the laws have been completely suspended. The problems surrounding corruption have already taken on a long-term character, as remnants of the former regime, and as such have affected all pores of socio-political life. In the presented circumstances, it is clear that the establishment of a market economy is impossible, therefore, there can be no implementation of economic components, as envisaged by the concept of sustainable development, in Libya. When it comes to the social component of the concept of sustainable development, attacks on human rights organizations have become more frequent.

#### VI. CONCLUSION

When summarizing all the analyzed aspects, the socio-political context of Libya, especially the current environmental preconditions for the implementation of the concept of sustainable development, (with emphasis on potential pollutants and the dangers of undeveloped, quality program for implementation by

waste management), which refer to both historical catch trends and future fishing trends, with mandatory reference to the tendencies of contamination of Libyan sea waters, which will inevitably negatively affect the existing fish stocks, in terms of their reduction, together with the phenomenon of poaching, (and therefore *Thunnus thunnus* species), then we can conclude that in ecological, socio-political and economic terms, their impact on the state of sustainable development in Libya and its eventual improvement is crucial in a negative sense. This led to the conclusion that the spillage of oil and oil derivatives, and during its production, is potentially dangerous for the survival of tuna. Previously, in most cases, it was a question of: "spillage from ships near the hatchery."<sup>14</sup>

Libya is also facing a lot of environmental problems, especially within water resources, where, as we have already indicated, there is high water pollution, which is primarily fraught with poor solutions for wastewater from factories, but also oil refineries, during which chemicals of very high toxicity contaminate water, the sea, and especially the coast. Therefore, it is the petrochemical industry that poses a serious problem for the implementation of the concept of sustainable development, especially when it comes to the aspect of environmental security in Libya. This, in particular, applies to the entire sector of the Libyan fishing industry. Namely, it is the ninth territory in a row at the world level, and when it comes to oil reserves. Therefore, due to the lack of a quality program for resolving the issue of waste (waste management), there is a constant fear of potential contamination of the environment, especially water resources, primarily fish stocks. If contamination occurs, it would disrupt ecosystems caused by various chemicals, resulting in permanent damage to wildlife (especially fauna / migratory birds, fish and marine mammals), as well as hazards to human health and emigration. complete indigenous communities. There are few countries, even more developed than Libya, that have avoided such an outcome.

#### AUTHORS

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