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**AGRICULTURAL UNIVERSITY OF TIRANA
FACULTY OF VETERINARY MEDICINE
DEPARTMENT OF VETERINARY PUBLIC HEALTH**

H A N D B O O K

ON JOINT MANAGEMENT OF POLLUTION-RELATED RISKS



Tirana, September, 2020

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REFERENCE

ACRONYMS AND ABBREVIATIONS

EU	European Union
FAO	The Food and Agriculture Organization of the United Nations
MPA	Monitoring Protected Area
MARDWA	Ministry of Agriculture, Rural Development & Water Administration
GSZ	Geographic Sub-Zone
FCO	Fishing Center Orikum
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
SSF	Small-scale fisheries
RAPAV	Regional Administrative of Protected Areas Vlora

INTRODUCTION

Albania's coast is about 426 km long. Its exclusive economic zone covers about 12,000 km². The coast can be divided into two parts: the northern, Adriatic coast, and the southern, Ionian coast. They have very different geomorphologic features.

The Adriatic northern part is dominated by shallow waters, sandy beaches, sandspits, wetlands and lagoons, whereas the Ionian southern part is a rugged rocky coast with high reliefs and caves (Tilot and Jeudy de Grissac, 1994). Located in the middle part of Albania, the city of Vlora is the second largest port (for trade and fisheries) in the country and one of the most attractive tourism resorts in the eastern part of the Mediterranean Sea (Bakiuet al., 2018; Frascchetti et al., 2011).). The north and south coasts of the Bay of Vlora are occupied by extensive beaches. Facing Vlora, Sazani Island and the Karaburuni Peninsula are composed mainly of Cretaceous limestone rocks. In contrast with Vlora, the rural population of Sazani Island and the Karaburuni Peninsula is low, with 5–20 inhabitants / km².

Despite the long coastline and the important role of the marine ecosystem in the country's nature and biodiversity, history, culture, tourism and socio-economy in general, there were no marine protected areas established in Albania until 2010. Recently, marine research has been developed in Albania, increasing awareness on Marine Protected Areas (MPAs) and marine conservation. The first MPA proclaimed was the Sazani Island – Karaburuni Peninsula, on 28th April 2010, with the status of National Marine Park (IUCN category II) covering an area of 12,570 ha (about 2% of territorial waters).

Habitats, coastal zone and ecosystems services always attracted humans and human activities. But this intensive concentration of population and excessive exploitation of natural resources puts enormous pressure on our coastal ecosystems leading to biodiversity loss, habitats destruction, pollution, as well as conflicts between potential uses, and space congestion problems. Because the well-being of populations and the economic viability of many businesses in coastal zones depend on the environmental status of these areas, it is essential to make use of long term management tools, such as integrated coastal management, to enhance the protection of coastal resources whilst increasing the efficiency of their uses.

The main threats to the albanian coastal marine environment have been identified and are listed hereafter: uncontrolled urban and tourism development; increased pollution in particular due to untreated waste and sewage discharged into the sea; deforestation and erosion; low public awareness and education level on marine and coastal issues; abusive interventions in river beds and watersheds; unsustainable land reclamation in coastal wetlands; illegal fishing and hunting; and unsustainable fishery and aquaculture.

I. Marine Fishery in Albania

1.1 The legal framework

The legislative framework for the fisheries and aquaculture sector includes several laws and by-laws. Albania is in the process of becoming an EU Candidate Country and, in this regard, is also in the process of aligning its legislation with the EU's *acquis communautaire*. Several by-laws have been approved that transpose some of the principles of the Common Fishery Policy into Albanian legislation. The legislation also contains the main principles of FAO's Code of Conduct for Responsible Fisheries, and establishment of the Fishery Management Organisation for marine and inland waters has begun.

Law "On Fisheries" (No. 64/2012 dated 31.05.2012), regulates all fishery activities and their management and aims at ensuring the protection of the marine life and internal waters through promoting sustainable development in the maritime space and the internal waters. This law does not regulate matters related to food safety and fishery products, consumer protection and fish diseases which are regulated by separate laws.

Law no. 8905 on the Protection of the Marine Environment from Pollution and Damage (dated 06.06.2002, as amended by the Law "*On Some Additions and Amendments to Law No. 8906, dated 06.06.2002*" (9868/04.02.2008). the marine environment of the Republic of Albania from pollution and damage, through their prevention and avoidance, caused by human activities at sea and coastal zone. Other important instruments In addition to the aforementioned law, (Management Protected Area-s) Law "*On Environmental Protection*" (No. 10.431, dated 09.06.2011) and Law "*On Environmental Impact Assessment*" (No. 10.440, dated 07.07.2011), are also important for MPAs:

1.2 Marine fishing fleet

In 2019, there are 651 entities licensed to exercise fishing activity. The fleet operates almost entirely in the Geographic Sub-Zone (GSZ) 18 (South Adriatic). There are 19 entities licensed more

Marine Fleet by vessel types, 2014 – 2019

Description	2014	2015	2016	2017	2018	2019
Distribution of Vessels by Vessel Type						
Trawlers	166	156	156	157	170	180
Seiners	4	3	3	5	4	9
Purse seiners	9	8	8	8	7	3
Dredgers	0	5	5	5	5	5
Gill netters	389	367	368	360	424	434
Multipurpose vessels	13	25	25	24	22	20
Total	581	564	565	559	632	651

Source: **MARDWA**

1.3 Marine fishing fleet by ports

In 2019, the port with the largest number of licensed vessels is the port of Durrës, with 37.33% of the total fleet. The **port of Vlora** has 30.41% of the total fleet number, followed by the port of Saranda with 15.82%. The fishing port with the lowest percentage of licensed fishing entities is that of Himara with 2.30%. The following tables show the Albanian navy from ports and fishing catches by water categories in Albania, respectively for the years 2014-2019

Table 1. Marine fleet by ports, 2014 – 2019

Description	2014	2015	2016	2017	2018	2019
Distribution of Vessels by Port						
Durrës	219	209	209	204	233	243
Vlora	210	183	184	181	198	198
Saranda	91	86	86	84	99	103
Shëngjini	52	65	65	73	78	79
Himara	4	11	11	10	12	15
Lushnja -Fier	5	10	10	7	12	13
TOTAL	581	564	565	559	632	651

Source: *MARDWA*

Table 2. Fishing catches by water categories in Albania

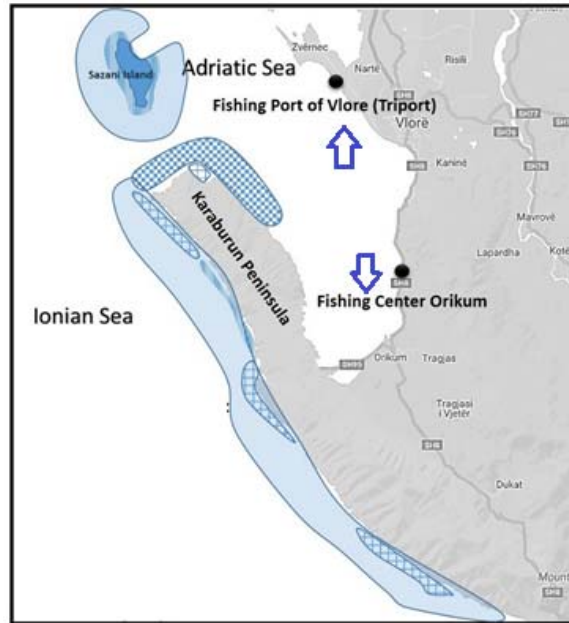
Year	2015	2016	2017	2018	2019
Aquatic categories					
I Total Fishing (1+2+3+4)	7.875	7.884	8.289	8.629	8.707
1 Marine	5.052	4.646	4.609	5.537	5.499
2 Coastal line	614	952	1.074	315	342
3 Coastal lagoons	550	598	599	350	94
4 Inland waters	1.659	1.688	2.007	2.427	2.772
II Aquaculture	3.000	3.200	4.000	5.138	5.229
III Mitylus galloprovincialis	295	1.450	430	1.108	1.075
Total (I + II +III)	11.170	12.534	12.719	14.875	15.011

Source: *Fishery INSTAT 2019*

II. Current state of Fishery activity in the Vlora bay

2.1 The Fishing Port of Vlora (i.e., Triport) and the shelter port of Orikum (Fishing Center Orikum [FCO]/ Radhime). Triport where 30-40 commercial fishing boats anchor, located 5 km north of Vlore, is one of the most important fishing ports in Albania, with the second- largest fishing fleet (including industrial fishing vessels) in the country.

Marine fisheries are divided into professional industrial fisheries and professional artisanal fisheries. The difference between industrial and artisanal fisheries is based on the type of fishing gear used by license holders. All forms of trawling and purse seining, regardless of the technical characteristics of the nets that are used, are regarded as industrial fishing activities



The locations of the two Fishing Ports of Vlora (Triport and Orikum)

2.2 Small-scale fisheries

Small-scale fisheries in Albania have developed remarkably since the 1990s as an alternative to unemployment and low income in coastal areas. The availability of SSF data is known to be crucial for devising proper management strategies (Guidetti et al. 2010; Di Franco et al. 2016).

Small-scale fisheries represents the unique sustainable fisheries activity in the Bay of Vlora, close to the office of Marine Protected Area (MPA) of Karaburun - Sazan. The Fishing Center Oriku (FCO) is located near the Info Point of the Regional Administrative of Protected Areas (RAPAV) in Vlore and the related fisheries activity represent the example of good collaboration between the MPA managers and the fisherman (blueboost.adrioninterreg.eu.)

This fishing fleet segment represents the small boats with 5-40 HP that fish no more than 3 NM from the coast, with around 100-120 fishing days per year, with small incomes only for daily consume. The artisanal boats don't use a fishing harbor, so are not easy to be monitored. Mostly of them are not licensed, so they don't report their catches. It is rather familiar activity where women give a good contribution. This kind of fishing is rather marginalized, neglected but it is a big reality in Albanian fishery and Vlora also.

In the outside borders of MPA-s this kind of fishing should be more attractive for operators, so, became most imperative knowing that situation through evaluation of the number of boats, their production per fishing day, the legality of their activity by the purpose of differentiation from the legal operators. With the legal operators should be built a healthy partnership with MPA-s administrators.

2.3 The fishing methods used

In the area of Vlora are exercised a variety of fishing activities and forms, aquaculture as well. Fishing activities are equally with the same variegation in the area.

In regards of the fishing trips and fishing routes we should stress that Vlora Bay is a Protected Area and according to its protection status and the Fishery Law Nr. 64 of date 31.05 2012 "On Fisheries", it is prohibited to apply Bottom Trawl Fishing on the Vlora Bay. In such condition we should say definitely that almost all fishing form applied in Vlora Bay is Artisanal Fisheries. This fishing form don't use fishing port facilities, they are based on capillary way along the sea coast. Some of the artisanal fishing boars we meet in the Treport Fishing Port.

Artisanal fishery covers all forms of fishing activity using fixed and selective gear such as hooks, fixed nets, trammel nets, and gill nets (<https://www.eurofish.dk/member-countries/albania>).

Artisanal fisheries have the roots of traditions since in ancient time and the coastal communities have inherited that skills generation to generation. Here coexist the artisanal or traditional fishing, entertainment or leisure fishing, sport fishing with the industrial, (pelagic or bottom trawl). Marine aquaculture by intensive floating cage has not damaged this coexistence, at least, as long as there is not an uncontrolled expands of the aquaculture sites or unmonitored for the impact of irreversible environmental effects that can cause. *It is a big number of Artisanal fishing, fishers and boats that are unlicensed, acting illegally fishing practices.*

LICENSED FISHING VESSELS IN VLORA (2018)

No	Boat	Administrator	Period licence	Fishing type
1	GABRIEL	Latif Azemi	2022	Trawler
2	ODISEA 1	Fjodor Bala	2021	Selective
3	MEHMETI	Qani Alushi	2019	SELECTIVE
4	GJYZELI	Jonita Alimuca	2022	TRAWLER
5	DIAMANTE	Engjellushe Dalipi	2021	SELECTIVE
6	DENIS	Llambi Nushil	2019	TRAWLER
7	XHOKLA	Maks Merko	2019	TRAWLER
8	KLODI 1	Klodian Isai	2019	TRAW+PELAG.
9	RICIOLA	Agron Nuredini	2020	TRAWLER
10	OQEANIA	Flamur Alimani	2021	TRAW+PELAGIC
11	MELISA	Zija Bejto	2019	TRAWLER
12	DE RADA	Mezan Jakupi	2020	TRAWLER
13	FABIANO	Dritan Kacaj	2021	TRAW.+PELAGIC
14	GERTA	Altin Nazdri	2021	TRAWLER
15	FIORE	Elham Zhegu	2020	TRAWLER
16	FORTUNELA	Isuf Nuredini	2018	TRAWLER
17	ANDI II	Ali Cakerri	2021	TRAWLER
18	PAVARSIA	Orgest Serjani	2019	TRAW.+PELAGIC

19	KELI	Enton Mishtaku	2021	SELECTIVE
20	SELMAN LEVANI	Astrit Levani	2019	TRAW.+PELAGIC
21	ROZETA	Besnik Pilinci	2021	SELECTIVE
22	AQCUARIO II	Skender Saliu	2019	TRAW.+PELAGIC
23	RICIOLA 1	Robert Nuredini	2020	TRAWLER
24	DEVI	Elham Malaj	2019	TRAWLER
25	MEDI	Pelagicumb Isai	2020	SELECTIVE
26	SULEJMAN HASANI 1	Gentian Xhema	2021	TRAWLER
27	ERIKLA	Llazar Nushi	2021	TRAWLER
28	LEDA	Figiri Refati	2019	SELECTIVE
29	IL-PU	Qemal Lato	2020	TRAWLER
30	POJANI	Agron Shermeti	2019	RRETHIME
31	RIGELS	Pelagicumb Lato	2020	TRAWLER
32	ELTJON	Flogert Arifi	2019	TRAWLER
33	LUCO-1	Flamur Isufi	2021	TRAWLER
34	PADAJ	Arben Nuredini	2020	SELECTIVE
35	BABALE	Mustaf Mustafa	2018	RRETHIME
36	AGIMI	Muhamet Feimi	2019	RRETHIME
37	BISTRICA	Sami Sulioti	2020	RRETHIME
38	ORGESTI	Ilirjan Haxhiu	2019	PELAGICAGJIKE
39	LA SPERANCA	Edmond Hyseni	2019	TRAW.+PELAGIC
40	KRISTO	Azem Lato	2018	TRAWLER

III. Impact of fisheries activities on marine ecosystem

Ghost nets according to fishermen's testimonies are fishing nets (nets, pur sein, hooks) that have not been thrown / abandoned by the fishermen with their conscience. They are stranded in stagnant objects such as boats stranded in the Vlora Bay, brought in by sea currents from fishing areas, fixed with anchors but pulled from there by large bottom fishing vessels that just launch depart from the fishing port and exit the bay with the launcher.

The trawls released during their voyage into the Gulf of Vlora to the depth of the bottom fishing (off the Gulf of Vlora) carry with them the nets that are badly damaged and dumped offshore by industrial fishing fishermen, often cutting them into pieces. small.

Another contingent are those stormwater fishing nets for stationary fishing. After being overthrown, they are displaced by the force of the hull and stuck in end objects like shipwrecks, in which case they are not tracked by their owners.

There was a very positive phenomenon in the group of fishermen in the row: there were artisanal fishing subjects that brought their nets out of the sea in the event of loss from bad weather or

for other reasons but beyond their will. This category of fishermen, but also capable divers, also provided this service to third parties in the event of network bottlenecks. But only when stagnation occurred at depths up to 20 m. At depths of about 40 m it is impossible to pull them out with just a simple polar coating.

Another positive thing is that the nets were never discarded after damage, they were repaired until they were no longer valuable. Before each trash was thrown into the trash, the top rope (along with the tap) and bottom (along with the lead) were removed. Only unarmed nets containing a small amount are disposed of at the designated waste site.

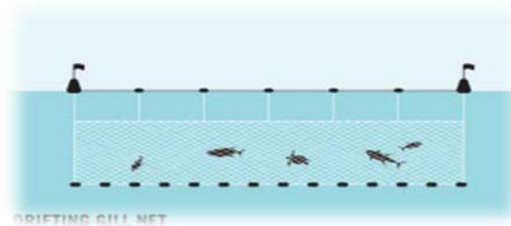
Fish depletion, assessments and related problems and impacts. Vlora bay has been from years under protection consideration from bottom trawl and pelagic fishing activities for the high environmental value that the area carries itself, but above all, for high positive effects on the maintenance and regeneration of the stock of some important marine reserve species in the area

Indeed, has not been fulfilled yet any real assessment of the fish reserve status on the area as well as fish stock or group stocks evaluation. On the other hand there is no assessment of fish production, yearly tendencies since no accurate statistical data's applied during last 25 years. To conclude on the tendency (decreasing or increasing) fish production must be implemented the accurate statistics over the years of all fishing impact on a stock or group of stocks, including the clear perception of the dimension of illegal, unreported and unregulated fishing activities in a selected area. If the legal aspects can be considered rather well we cannot say the same for their application in the field and moreover for inter-institutional cooperation.

Illegal fishery activities occurring in the area Continuously has been reported for the illegal bottom trawl within the Gulf of Vlora. Moreover, the illegality of the fishery activities is not only within the bay but is extended outside the Gulf of Vlora, caused not only from the National operators but even from foreigner, mostly from Italian vessels. Some of them are evidenced, processed but never penalized. If we analyze the fishing fleet according the structure of them we can declare that only about 90% of professional fishing boats are licensed and registered in the National Fishing Fleet. When speaking for the artisanal fishery and Small Scale Fisheries less than 30-40% of them are licensed and or registered. So, the non licensed categories don't report and is out of monitoring for their activity and fish production. And the result comes directly in the fishing nets of the legal fishermen community which are landing fewer and fewer fish. The mostly illegal of activities identified in the area are fishing without license/Authorization, fishing in the prohibited areas, prohibited fishing gears and/or with smaller mesh size, by exterminator means, irregular fishing and with bad practices that results unfavorable for the fish reserve in area, that harm/mismanage the coastal lagoons with which the coast of Vlora is rich and the role of lagoons is irreplaceable to the fish resources.

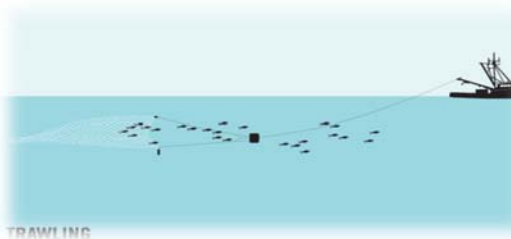
Fishing practice by diving equipped with compressor, has led not only damages the target fish but this kind of fishing is associated with the exploration and exploitation of corals, sponges, sea cucumbers, species prohibited by law and by which Vlora coast is rich. The coast of Vlora is rich on a variety of ecosystems which are not studied enough; such ecosystems appreciated for their combination of their impact on the maintenance and regeneration of fisheries resources. Empiricism and irresponsibility have accompanied economic activities in this area, which is so rich environmentally and of diverse

Gillnets are sets of panels of uniform mesh size, which form a large net-wall hanging vertically in the water. Suspended in the top- or mid-depths of the water (a drift gillnet), or anchored to the seafloor (bottom gillnet), gillnets trap fish by their gills. They are very effective – and particularly destructive.



Trawling involves dragging a large fishing net with heavy weights behind a boat, either mid-water or across the bottom. The net indiscriminately catches or crushes everything in its path. Consequently, by-catch is extremely high and nets are often lost due to snagging on the bottom.

Trawling is a common fishing technique. **It is forbidden to trawl within Vlora Bay.**



Purse seine is a long wall of netting deployed around a school of fish and pulled tight, thus enveloping the school of fish (and any other animals) in a purse-like structure.

Purse seines target pelagic fish of all sizes, including tuna, and are therefore frequently used in the western Indian Ocean, often in combination with FADs (see below)



On the other **hand, pole and line**, are other traditional fishing technique associated with a low impact and **is sustainable fishing technique**.

3.2 Pollution risk assessment through the analytical results performed

The most delicate phenomena of marine coastal water pollution in past years in Vlora Bay were heavy metal pollution (mainly metallic mercury from past discharges of a soda plant near the city of Vlora) and organochlorine pesticides (OCs). Moreover, urban waste is dumped into the sea without any treatment. In Albania, OCs were mainly used as insecticides such as dichlorodiphenyltrichloroethane (DDT), hexachlorobenzene (HCB), and lindane before 1990. As a result of recent transformations in agriculture, pesticide use has generally declined after 1990. From year to year, the distribution of PCBs has changed in favor of less volatile technical mixtures (such as Aroclor 1260), indicating a ground-based contribution, probably due to the importation of contaminated transformer oils or their malfunctioning existing.

No data have been available on the levels of those pollutants in biota from the coastal areas of the Gulf of Vlora until 2010. Implementing decisions on actions to monitor and evaluate marine pollution, in coherence with all partners, the AUT carried out analytical testing for: heavy metals was measured in 86 cefalopodes samples (54 samples *sepia.spp* + 32 *Loligo spp*), polychlorinated biphenyls (PCBs) and organochlorine pesticides (56 samples), residues of antibiotics (68 samples) in fish were measured. PCBs and heavy metals were measured in 2 samples, and PCBs in 2 sediments samples. OCs pesticides and PCB were found to be below the detection limit, in fish, water and sediments. Overall, the results show an environmental quality of the Bay of Vlora, which similar to those a marine protected area. In fact, what is to be discussed is that in the past years Hg levels have been problematic as a result of the of past industrial activities (especially soda plant discharges), those over the years, after its closure have improved significantly. Analyzes of antibiotic residues in fish also show satisfactory results

The results of analysis performed in samples fish, cefalopodes and water from Vlora Bay also support its suitability in environmental quality assessment of marine coastal areas.

There were small variability of different microplastics found in all species of fish, since we found only filaments and smaller fragments. We didn't expected to find so many filaments in fish gut, but this result is in correlation to high abundance of filaments in sea surface samples. There is also difference in number of filaments and fragments, which we can correlate to the specific fish feeding habits. Therefore we found the most microparticles, mostly filaments, in *Pagellus*

Erythrinus that feeds low in the food chain, It is omnivorous, but mainly feeds on smaller fish and benthic invertebrates either as direct primary consumers and detritivores, or at a secondary level feeding on small macro fauna, what means it eat on the shallow bottom floor and on the sea surface, preferably near waste waters and marinas. The least of microplastics we extracted from the gut of *Solea solea* specimen, which lives and feed mostly on the sea floor, were is not so much exposed to floating filament and fragments in the water column.

IV. Events and informative campaigns about seabed and fishery management

4.1 Promoting awareness and informing the fishing community

Two experts in the field, Jerina Kollitari and Mimoza Cobani were engaged in compiling a *Questionnaire type used for fishermen*, that aims to develop a series of actions to strengthen and promote an integrated planning to address the problem of ghost nets in Vlora Bay zone, and ensure sustainable management of the marine and coastal environment of the Adriatic Coast and Sea. The interviewer`s were fisherman from small scale fishery that operate in Vlora Bay: that use the small vessel with length 5 to 10 meters.



Radhima (Vlora Bay), 23/06/2019

Fishermen also pointed out some of the areas in Vlora Bay like the area of abandoned ghost nets: Place "Shyqyri Alierko" (the ships drowned in the sea in 1940 year). The depth 12 meter and distance from the coast about 1 km / Place "Spitalieri" (The Hospital ship is drowned in the sea in 1943 year). The depth 32 meter and distance from the coast 1,5 km/ Place "Mermeri" (Marable), the depth 45 meters and distance from the coast 3 km./ Place

Shengjan. (two drowned ships during second war). The depth 30 meter and the distance from the coast 2 km.



Fishing Port - Treport (Bay of Vlora). 21 August 2019



Fisherman Meeting (Radhima, Vlora Bay), 05/10/2019

It was also a good exchange of experiences between our fishermen from different fishing ports of Vlora and fishermen from Italy, where Italian and Albanian experts coordinated in the exchange of information and methodologies between fishermen, the way of organizing the fishing field and working conditions.



Vlora, December 2019

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