

Development of Fisheries and Aquaculture in Albania

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Abstract

Albania has great infrastructure and natural resources for the development of fisheries and aquaculture sector, commerce and industry of fishery processing products etc. So Albania has a coastline of about 474 km long, an extensive network of hydrography.

It ranks in the first countries in Europe in terms of water resources. The hydrographic basin of Albania has an area of 43 300 km² or 57% more than the territory of the state of our country and 50.000 km rivers and streams, 1,100 km² surface of lake water and sufficient artificial reservoirs.

In this article all these resources will be analyzed in detail; it will be also analyzed the identification and further development of these resources, which has special importance in building strategies and policies in the direction of further development of this sector aiming at increasing production, paying attention to the sustainable use of these resources without damage on the biodiversity and the environment.

Research in this field is carried out mainly by universities, mostly from the Agricultural University of Tirana. The Ministry of Agriculture in collaboration with the Ministry of Environment Forests and Water Administration, has played an important role in constructing strategies for the development of this sector as well as commerce and industry of fishery products processing through projects MEDITS and AdriaMed where an important place has the study of ecological and environmental effects, mainly in the lagoons in cases of fishing beyond manufacturing capacity.

Very important are also the infrastructure and human resources, which give weight to the development of this sector. In this country there are 4 ports that develop fishing activities, where the most important is the largest port in the country, the port of Durres. Social effects of the development of this sector are also important in studies, mainly in terms of employment and community consumption per inhabitants, which is 3.3 kg / year of about 15 kg / year consumed by the countries of the Mediterranean region.

At the end of this paper we will list some premises development of this sector, recognizing it as an important output sector with great impact on the economic and social life in the country.

Keywords: Fishing, Infrastructure, Water Resources, Sustainable Development.

Introduction

Albania has a coastline of about 474 km long, an extensive network of hydrograph. It ranks in the first countries in Europe in terms of water resources. The hydrographic basin of Albania has an area of 43 300 km² or 57% more than the territory of the state of our country and 50.000 km rivers and streams, 1,100 km² surface of lake water and sufficient artificial reservoirs. Under these conditions, concluded that Albania has sufficient assets to develop fishing and aquaculture in promising levels. In this context, it is necessary to undertake studies in this field in terms of the assessment of these natural resources, methods of rational using and sustainable development of fisheries. Albania has also infrastructure and human resources that enhance the development of this sector. In this country there are 4 ports that develop fishing activities, where the most important is the largest port in the country, the port of Durres.

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In this paper, will mostly analyzed issues of sustainable development of this economic activity, emphasising on integrating its management with other sectors of the economy and services.

Factors that have influenced in the development of fisheries and aquaculture

In recent years, Albania fisheries have become dynamically developing sectors of the food industry, and many private agencies have taken measurest by investing in modern fishing fleets and processing factories in response to growing international demand of international trade for fish and fishery products. Actually, the value of fishery and aquaculture from catches, estimated at about 40 million \$, which 22 million \$ represents fishing at sea, coastal and inland waters, 8 million \$ aquaculture and the remaining represents mussels.¹ The factors that influence in the development of fisheries and aquaculture in Albania are:

Natural Resources

Albania possesses important natural resources in service to the development of the fisheries and aquaculture sector, based mainly on the abundant water resources. In this context, Albania possesses:

- 470 km of coastline and 12 miles marine territorial waters. Waters of the Adriatic and Ionian Sea exploited extensively for fishing. Here exert their activity the most important ports in the country like Durres, Vlora, Saranda and Shengjin. In the table below are given the indicators of species that grow along the Albanian coast.

Table 1: Indicators of species that grow along the Albanian coast

¹“Analiza ekonomike e Peshkimit. Raport Final”, Ministry of Environment, Forestry and Water Administration

Species	Kg/km ²	N/Km ²
Helicolenus dactylopterus	0.24	20
Lophius budegassa	6.29	11
Lophius piscatorius	1.58	
Merluccius merluccius	16.69	188
Micromesistius poutassou	0.82	6
Mullus barbatus	8.59	266
Mullus surmuletus		
Pagellus erythrinus	2.34	
Phycis blennoides	1.24	92
Raja clavata	2.28	2
Spicara flexuosa	11.14	728
Trachurus mediterraneus	8.52	154
Trachurus trachurus	7.76	1535
Trisopterus minutus	303	225
Zeus faber	5.07	8
Aristaeomorpha foliacea	1.78	72
Parapenaeus longirostris	10.76	1348
Eledone cirrhosa	7.39	50
Eledone moschata	4.73	26
Illex coindetii	2.46	
Loligo vulgaris	3.55	622
Octopus vulgaris	1.86	

Source: Estimates of the General Directorate of Fisheries

- 50,000 km rivers and streams. Albania's hydrographic network consists of 11 main rivers with average flow about 1,245 m³/sec.
- 1,100 km² surface of lake water. According to lake country fund counted 247 natural lakes of various types and sizes, with a volume of approximately 60 billion m³ and 5 main artificial lakes. The largest and the most important natural lakes in the country are: Shkodra Lake, Ohrid Lake and Prespa Lake. In the table below are given some indicators of the most important natural lakes in the country. Shkodra lake is the largest lake in the Balkan.

Table 2: Some indicators of the most natural lakes in the country

Lakes	Area (ha)	Area within state borders (ha)	Location	Species
Shkodra Lake	36000	12000	North part of Albania	carp, karasin, mullet, bleak, eel, lucioperca
Ohrid Lake	32000	9500	south-eastern part of Albania	lake trout, salmothymus ohridanus, carp, skobus, bleak, rutilus rubilo.
Prespa Madhe	12000	4900	south-eastern part of Albania	bleak, trout, karasin and carp
Prespa Vogël	9000	400		

Source: Author

In Ohrid and Prespa Lake produced mostly Trout and Koran. According to the data obtained in the Korca Inspectorate of Fisheries, their contribution to the total production varies 75-80%. For this production are raised several facilities in Lin, Tushemisht, Zagorcan and Zvesda.

- Important lagoon surface lagoon about 10,000 ha with a fish yield ranging from 42-97 kg / ha. Coastal lagoons as intermediate salty ecosystems between land and marine waters are aquatic environments with high productivity and biodiversity which realize the enrichment with fish and clams of the coastal zone. Narta lagoon classified as lagoons with the highest fish production, while for the production of different mollusks distinguishes lagoon of Butrinti.

Table 3: Lagoons in Albania, location and fish production

Lagoons	Area(ha)	Location	Fish production (Tons per year)
Narte	2800	NorthWestern of district of Vlora	130-140
Karavasta	3900	West of Albania, near to Lushnja town	50-60
Butrint	1600	Southwestern Albania	96
Orikum	150	South western of district of Vlora	8-10
Patok	250	Along the Adriatic Sea in the west of the city of Lezha.	30
Kune Vain	250	On the northern Albanian Coast, near Lezha region.	45
Vilunit	250	North-west of the port of Shengjin	16

Source: Ministry of Environment Forestry and Water Administration

- Sufficient artificial reservoirs, 700 with a total area of 12,000 ha. A considerable part of them, mainly in rural areas, used for the cultivation of carp.

Table 4: Lakes in Albania, location and fish production

Lakes	Area (ha)	Location	Species	Fish Production (Tons per year)
Fierza	5000		Pike perch <i>Stizostedion lucioperca</i> and perch <i>Perca fluviatilis</i> .	50
Shkopeti	80	On the Mat River	Ciprinid, carp, salmon, kerosene, eel.	4
Ulza	150	On the Mat River	<i>Hypophthalmichthys molitrix</i> , <i>albranus albranus alborella</i> , <i>cyprinus carpio</i> , <i>carassius</i>	30
Vau i Dejes	247	On the Drini River	<i>Alborella alborella</i> , <i>Cyprinus Carpio</i> , <i>Carassius carassius</i> , <i>Alosa falax nilotica</i> , <i>Perca fluviatilis</i> , <i>Hyphthalmichthes molitrix</i> . Rosette	30

Source: Ministry of Environment Forestry and Water Administration

Early traditions of development of this sector. Fishing and aquaculture are developed very early, through traditional methods mainly in Shkodra, Ohrid and Prespa lakes and in coastal lagoons like Narta, Butrint, etc. The old format and fishing craft were developed mainly in the coastal area, in the area of catkins up to 2-3 miles away from the Adriatic coast and 1 mile from the Ionian Sea. Traditional fishing is inherited from generation to generation. Fishermen in this category have better recognition not only in the preparation of nets, boats and fishing boat for fishing areas but also in the techniques of using fishing vessels.

Favorable geostrategic position and proximity to regional markets. Albania possesses a favorable geographical and strategic position. The diversity of hydrological resources and

typical Mediterranean climate conditions favored the development of the fisheries sector. A special importance is the country's transit position and close distances to markets in the Balkan region and beyond. Albania is bordered by Montenegro to the northwest, Kosovo to the north, the Republic of Macedonia to the east and Greece to the south. Many foreign researchers have evaluated Albania a country "gateway" or "gateway-tie" as an important transit center linking the East with the West.



Map 1: Natural Resources, Fishery and Aquaculture Activities
Source: SonilaXhafa, ArcMap/GIS 10

The development of tourism as a safe market for this sector. Domestic and foreign tourists represent an important consumer for the market and the

fishing industry. According to the Ministry of Tourism, in 2011 Albania was visited by 4 million visitors.

Numerous recreational marine lakes and lagoons, enhance the alternatives to the development of recreational fishing as a sustainable form of this sector to support the further development of tourism. The concept of recreational fishing entails all types of fishing activities including sport fishing activities undertaken by any individual, with or without a boat, for leisure purposes, and does not involve the selling of fish or other aquatic organisms. As far as could be determined, six countries in the area, namely Albania, Croatia, Greece, Slovenia, Spain and the Syrian Arab Republic, have established a licensing system for individual recreational fishers.

Strengthening the legal framework and timely involvement of Albania in important regional and international conventions. Albanian legislation in the field of fisheries is based on the principles of exploitation of fish resources in a sustainable way and precedes the development of the fishing sector. The general principles of this legislation are based on the Code of Conduct for Responsible Fisheries of FAO, and also it defines relations between Albania and other countries for fisheries and aquaculture through the obligations of each country, to ensure compliance with the rules that apply to fishing. Instruments and agreements relating to the management of fishing in Albania are listed below.

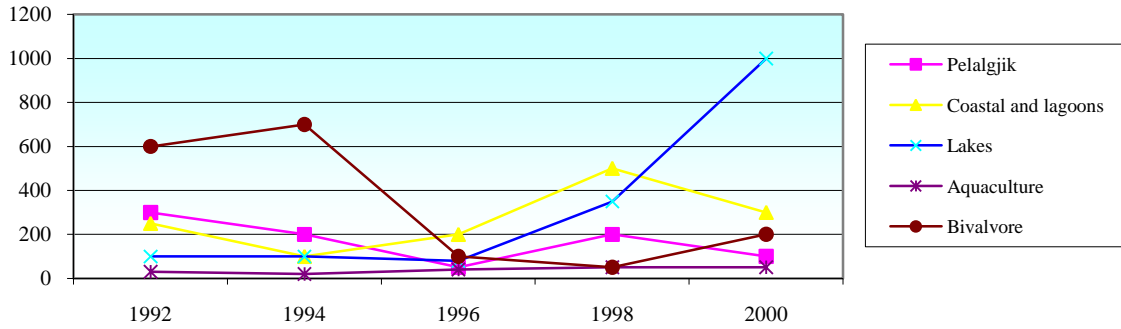
The 1982 UN Convention on the Law of the Sea (ratified in June 2003)
1995 Code of FAO Code of Conduct for Responsible Fishing (implemented as a voluntary code 1997)
Implementation of the 1993 FAO Agreement (received in May 2005)
General Fisheries Commission for the Mediterranean (GFCM) (ratified in July 2003)
International Commission for the conservation of Atlantic Tunas (ICCAT) (observation status)
1957 European Fisheries Advisory Commission of the Internal Waters (EIFAC)
Law 9055 dated 24.4.2003 "On the accession of the Republic of Albania to the" Convention on the Law of the Sea, Organization of United Nations
Law No. 9401 dated 19.05.2005 "On the accession of the Republic of Albania" Agreement to promote compliance with international measures of management and conservation of resources by fishing vessels on the open seas

In summary Albania through these potentials, has all the possibilities to increase productivity in the domestic and foreign market, to increase exports to the EU and regional markets competing with high quality.

The development of coastal and lake fishing

The development of fishing and increasing production and consumption of fish goes in parallel with the development of the fishing fleet. The fishing fleet is based on 4 bays (Durrës, Shengjin, Vlora and Saranda). In 1946 was built the first professional fishing ship near the port of Durrës. The fishing fleet was gradually improved in quality as well as a number, where in 1960 the number of fishing vessels with different power and capacity reached 30. The sardine fleet consisted of 60 vessels fishing out of which 28 in Vlora, 12 in Durrës, 12 in Shengjin and 8 in Saranda. For their processing were established the first factories for the production of canned in 1970. With the liberalization of the economy, in 1993 fishing fleet was privatized and at the same time Albania imported about 150 fishing boats, mainly in Italy but also from Greece.

Graphic 1: Fishery Production in Albania (1992-2000)



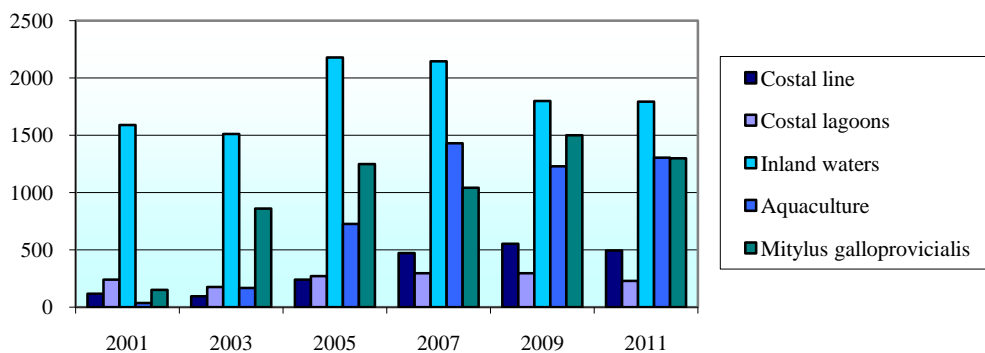
Source: AdriaMed the General Directory for Fishery

During the first decade of transition production in fisheries has increased at lower rates and this is due to:

- Amortization of the existing fish fleet as a result of old age. Most of the fishing vessels have an age range from 25 years to 40 years, but there are also ships over 60 years. Repair of fishing vessels conducted partly in Durres, in military ports and mostly in neighboring ports.
- Losing a part of the fleet during the mass emigration in 1991, but also in 1997. The ships that were used to send the emigrants in Italy were the type of trawl fishing, the bigger and more able to afford over the Adriatic
- Lack of port and ancillary infrastructure
- Fall of the workforce in this sector as a result of mass immigration.

During the second decade observed fluctuations in the quantity of Fish caught as in marine and lagoon waters. This refers to fluctuations in the production of these ecosystems. During this period, do not always respect the norms of sustainable use of these ecosystems. Furthermore the fishing fleet is growing at the slowest and its maintenance and repair has been restricted.

Graphic 2: Fish caught in tonne



Source: Ministry of Environment

By 2007 the fishing fleet has grown at lower rates. In this period investments were mostly oriented in infrastructure improvements to the existing fleet.

Table 5: Fleet by type of fishing

Type of Fishing	2001	2003	2005	2007
Total	198	213	247	269
Selective	62	63	63	68
Pelagic	11	11	15	21
Purse seiners	125	139	169	180

Source: Ministry of Environment Forestry and Water Administration

According to the data obtained from the General Directorate of Fisheries, Albanian fleet currently consists of 146 registered boats with engine power from 23.75 HP. The average engine power of the fishing fleet is around 321 HP. About 71% of vessels have 120kf engine power.

Table 6: Technical indicators of quality of fleet in Albania

Ports	Ships	Engine power (kw)	Days at sea	Workforce	Production in town	Value of Catches	Average of Consume
Durres	51	10.168	8.051	207	1623	479	232
Sarande	28	2.371	4.110	74	474	110	55
Shengjin	36	6.582	5.668	144	1126	327	158
Vlore	31	4.631	4.612	125	1047	223	101
TOTAL	146	23.752	22.441	550	4.270	1.140	546

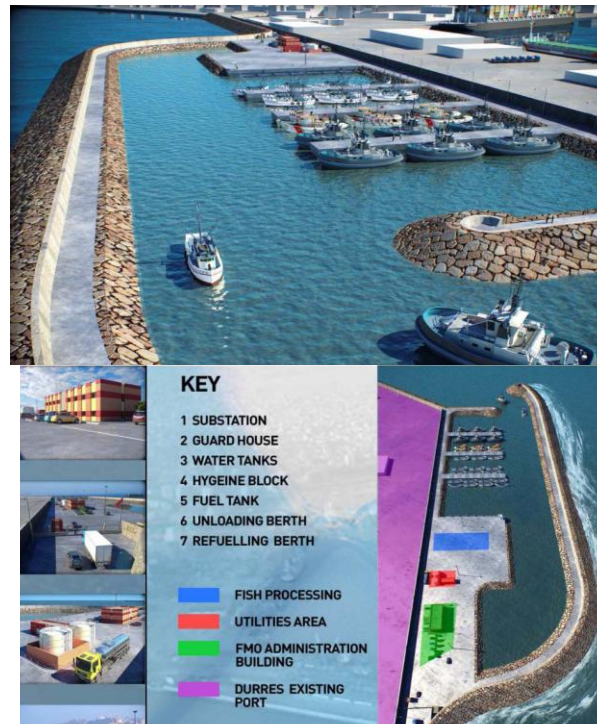
Source: FD - MoAF; IREPA

Shengjini and Durres ports have greater fishing fleet average engine power compared with other ports (average 300 HP). Mostly fishing fleet is concentrated in the Port of Durres, which constitutes 35% of the total.

By calculating an import of fresh fish and 3185 tons of canned, fresh fish export of 550 tons and a local production of 7376 tonnes per capita consumption appears that, for a population of 3 million people, is approximately 3:33 kg / spirit. On the other hand, fish consumption in the country is low compared with the average Mediterranean countries is estimated at 15.1 kg / capita (countries not members of the EU, 8.1 kg / capita and the Mediterranean EU members 30.7 kg / capita).

According to a geographical analysis results that fish production is concentrated mostly in the port of Durres with marine production around 1623 tons. This production represents 38% of the total production in the country. The largest concentration of production in the Port of Durres related to technical indicators of quality of fleet and with the greatest potential of the work force. An important issue is the planning of Durres fishing port, in the western part of the commercial port, about 1.8 hectares and with a fleet of 130 fishing ships that anchor in three Pontine.

Photo 1: Durres Fishing Port. Source: Ministry of Environment, Forestry and Water Administration



Development of aquaculture and fishing processing industry

First Aquaculture developments recognized in the late 60s, mainly concentrated on the cultivation of mussels (*M. galloprovincialis*) and shrimp (*Peneaus japonicas*). Albania has only one activity of cultivation of *Peneaus japonica* shrimp in an area about 215 ha in Kavaja town, built years ago and reactivated as activity through an Italian partnership. Other cultivated species of this activity are: cold water salmonid, *Oncorhynchus mykiss*, shellfish (especially *M. Galloprovincialis*), shrimps, and *S. Aurata* Koce D. Labrax bass etc.

Political and economic changes after 1991 brought changes in these activities. All enterprises and fish farms as for carp and trout cultivation was privatized.

Currently this activity produced about 8,000 quintals of mussels from 47 subjects, 3,000 quintals of keys and bass from 11 subjects and 50 quintals of shrimp from one enterprise. Processing industry has its origins in 1958 to Canning Vlorë Combine. Its activity in this period mainly relates to the conservation of sardines, but also the smoked eels, tuna, acraeges, shapes and octopus. Till the 1990 this activity was expanded with processing factories in Durres and Lezha. During the transition the private and domestic investment, increased the number of processing entities, mostly in coastal regions. For the development of this activity highlights Lezha Region with 4 fishing processing factories. The development of this industry has positively influenced in employment opportunities for rural communities and improving the quality of life in these areas. Most local products are used for export. The great advantage in this issue is the status of Albania as a "third world country" on "setting in the European market of fishery products". It allows fishing industry to export to neighboring countries such as Greece and Italy. In this condition Albania is in a very favorable position compared to many other neighboring countries.

Actually there are 37 activities approved for export to the EU that perform processing and marketing of fish products. All these activities are private enterprises. About a third of fish caught in the sea that includes size and better quality species such as sea bass and wrasse, shrimp and octopus exported contributing to the economic value of the sector.

Sustainable development of fisheries and aquaculture sector

After 1991, in terms of the development of an economy in transition, the fishing control process was low. Overexploitation of important fish stocks, modifications of ecosystems, significant economic losses, and international conflicts on management and fish trade still threaten the long-term sustainability of fisheries and the contribution of fisheries to food supply. This situation led to changes in the structure population by overexploitation of productive ecosystems primarily in the family of trout, acorn, mullets, eels, etc.. During the second decade of transition, generally exploitation of water resources and fisheries in Albania has been rational and responsible, with the exception of some sporadic cases where fishing takes place outside the rules and general control, mainly in rural areas. However, the transition has generally convey difficulties in economic and legal organizing, dictating a number of risks that affect the sustainable development of fisheries and aquaculture sector.

A. Ecological sustainability risks in marine, river and lagoon environments

- Many fisheries resources could not sustain an often uncontrolled increase of exploitation. This situation is mainly caused fluctuations in the production of lakes species such as carp, skobuz, gudgeon, which are very desirable for consumption and export. Bleak until 1990 constituted 70-75% of the total fish production, while currently its use for processing, and sale and consumption remains limited, even for research purposes².
- Urban pollution in general, mainly reflected in the waters near the coast have influenced the decrease of production of species. Fluctuations of the trout production have been mainly that of Ohrid, because of the urban and tourist pollution, and because of the phosphorus spill in the lake water. In a year in the lake discharged about 150 tons of phosphorus³.
- Developments and irregular forms of fishing are another factor that threatens production in marine, lakes and lagoon waters. Application of abusive forms of traditional fishing as the use of explosives, poisonous etc. threaten production in these ecosystems. Fluctuations in production has lagoons, mainly in the Karavasta and Narta Lagoon, dictated by the irregular fishing forms in time, space, quantity and diversity. An issue that should be noted is the weakening of the role of the embouchure in maintaining a selective fishing, updating resources, recycling of small fish (recruits) etc.
- The lack of specific and integrated development plans of marine, lake and lagoon ecosystems with regional economic development and wider, in general weakens the sustainable use of water resources and sustainable development of these ecosystems.

B. Infrastructure risks

²Ministry of Environment Forestry and Water Administration

³National Geographic: "Fossil Trout" Faces Extinction in Balkans

- Fisheries and aquaculture sector but also fisheries processing industry have been developed for years in continual difficulties related to basic and support infrastructure for the production and marketing of fishery products. Old age of vessels is an important indicator in this regard, which should be evaluated in terms of necessity investments for their repair and maintenance. On the other hand, their depreciation increases the cost of fuel and consequently the cost of fishery products in the market by reducing profit. According to data in the General Directorate of Fisheries fuel cost takes a weight about 68% of the average cost, while the cost of the equipment 9.7%, maintenance 5.5%, lubricants 2.9%. Based in an economic analysis of the General Directorate for fisheries results that the annual profit coefficient is limited and reaches 3-12% of turnover (2200 to 11460 USD per year per vessel). Another problem is the lack of security and repair centers of ships. Most of them repaired in neighboring ports that increases again the cost of production but also creates difficulties and delays in the marketing of products. A problem to be assessed is the misery of mussel cultivation plants in Lake Butrint, where currently only 20-50% of their capacity utilized

C. Institutional and legal risks

- Weakness in the implementation of the development strategies of the sector as well as management plans;
- Weaknesses in controls and supervision and enforcement of legal norms regarding the sustainable use of marine, lake and lagoon ecosystems.

Suggestions

The excess capacity of fishing fleets has been widely recognized as a major reason for overfishing and the degradation of marine fisheries resources throughout the world. In the service of sustainable development of fisheries and aquaculture sector, it is important that through legal instruments, research and operational stock of local and regional authorities be undertaken in the framework of measures:

A. Sustainable use of productive ecosystems

- Development of fisheries in depth and shallow waters through alternative forms of fishing in coastal and lagoon waters that are in the protection of biodiversity and fish stocks.
- Regulation of fishing gears and methods is a common feature of fisheries legislation in Mediterranean coastal states. This measure is designed to prevent fishers from using particularly destructive gears or methods. One of the most common approaches is for states to establish a list of prohibited gears and methods; explosives, chemical, poisonous substances or electrical devices for fishing purposes are universally prohibited.
- Legal assessment on a periodic basis for the determination of fishing days and fishing seasons based on production balance and replication fish species. Some Mediterranean coastal states have taken measures designed to limit the time of operation by duly authorized fishing vessels through the implementation of days-at-sea program. Closed season and temporary suspension of fishing operations are measures designed to ease pressure on fish stocks by stopping fishing operations for a specified period of time. Closed season is intended to allow species reproduction and thus coincides with the breeding time of major commercial species. A temporary suspension of fishing operations is a circumstantial measure that is generally taken in response to an

emergency situation, or for the purpose of allowing fishery resource recovery. In service of this goal it is necessary to review and evaluate periodically the number of fishing licenses in the sea and the lagoon, but also in lakes. In this context it is necessary to control the level of fishing effort so as to adjust it to the availability of the fishery resource and to evaluate the fishing capacity of the national fleet to determine whether it should be reduced or could be increased under certain conditions.

- Development of fishing in order to protect the lagoon ecosystem, through the creation of lagoon areas where fishing is prohibited or restricted, recreating the links between the lagoon and sea water, minimum landing sizes for species of fish and other aquatic organisms are often set to prevent the capture of juvenile fish or non-fish species and allow sufficient time for fish and the other species to mature and thus reproduce. Such measures are necessary in Karavasta and Narta lagoon.
- Minimize the impact of urban tourism and industrial pollution in marine river, lake and lagoon ecosystems for protection of biotopes and species of special interest.

B. Infrastructure improvements in the fisheries sector.

- Diversification, restructuring and modernization of the fishing fleet,
- Expansion of existing ports, primarily that of Durres, maintenance and improvement of fishery space infrastructure since the Durres holds first place among other ports for the quantity of fish and shale production.
- Establishment facilities for repairing and maintenance of fishing boats in the four ports, in order to increase the readiness of technical indicators and operating in the fishing fleet.
- Systematic monitoring of the fleet to avoid delays in the production and sale process
- Establishment of a survey and orientation unit through GIS able to pursue fishing activity in the ports sector and provide the necessary data to support policies of rational use of marine resources.

C. Legal and institutional improving

- Establishing fishing zones by legal and institutional instruments as management tool that allows to transfer to the local authorities the right of determining segments of fishing operations spatially by authorizing only certain types of fishing activities by specifying categories of vessels in each fishing zone.
- Special protection by legal instruments through the establishment of lists of protected species of fish and other marine organisms that regarded as threatened.
- Legal and organizational approximation of the Common Fisheries Policy of the European Union set by taking into account market factors and perspectives of future development
- Increasing the implementation of local and regional plans for the fishery.

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