

Assessment study on governance framework for fisheries in the Caza of Tyre - South Lebanon

*Sustainable Fisheries Management for Improved Livelihoods of the Coastal
Fishing Community in Tyre (South Lebanon)
Tyre – South Lebanon*

Table of Contents

Executive Summary	4
Overview	4
Mediterranean and Black Sea fisheries.....	5
Lebanon: Fisheries country profile.....	8
<i>a- Country brief</i>	<i>8</i>
<i>b- General geographic and economic indicators</i>	<i>11</i>
<i>c- Ecological context.....</i>	<i>12</i>
<i>d- Marine fish catch profile.....</i>	<i>12</i>
<i>e- Fishing practices/systems</i>	<i>14</i>
<i>f- Main resources.....</i>	<i>15</i>
<i>g- Management measures and institutional arrangements applied to main fisheries.....</i>	<i>15</i>
<i>h- Fish utilization</i>	<i>16</i>
<i>i- Fish markets.....</i>	<i>17</i>
<i>j- Socio-economic contribution of the fishery sector.....</i>	<i>17</i>
<i>k- Employment.....</i>	<i>19</i>
<i>l- Institutional framework.....</i>	<i>19</i>
<i>m- Strategic development plans for the fisheries and aquaculture sectors</i>	<i>20</i>
<i>n- Nature reserves.....</i>	<i>22</i>
Caza Sour	24
<i>a- Geographical & administrative perspective</i>	<i>24</i>
<i>b- Agriculture</i>	<i>25</i>
<i>c- Fisheries sector</i>	<i>25</i>
Fisheries governance	30
<i>a- Definition</i>	<i>30</i>
<i>b- Principles of sound governance.....</i>	<i>31</i>
<i>c- Institutional frameworks for fisheries governance.....</i>	<i>32</i>
<i>d- Small-scale fisheries and their governance.....</i>	<i>32</i>
<i>e- Fisheries governing modes.....</i>	<i>36</i>
<i>f- Governance of tenure.....</i>	<i>39</i>
<i>g- What is fisheries management?</i>	<i>44</i>
Local survey for governance	46

Annex II: ToR

Annex II: Laws and regulations related to the fisheries sector in Lebanon

Annex III: Questionnaire

List of tables

Table 1: General geographic and economic indicators

Table 2: Lebanon estimated catch data for 2015

Table 3: Lebanon data for catches by vessels categories

Table 4: Lebanon fishing vessels length distribution (DFW 2016)

Table 5: Socio-economic indicators

Table 6: Economic performance of the Lebanese fishing fleet in 2011

Table 7: Social characteristics of the skipper and fishers by fleet segment.

Table 8: Characteristic of the fishing métiers in Tyre

Table 9: Landings (kg/boat) of the main fishing métiers in Tyre

Table 10: Typology of rights-based management systems – examples found in OECD countries

List of figures

Figure 1: Eastern Mediterranean fisheries at a glance

Figure 2: Continental shelf and bathymetric contours of the Lebanese coast

Figure 3: Main fishing ports in Lebanon

Figure 4: Main first sale market (ex-vessel) channels for production in Lebanon

Figure 5: Organizational chart of the Department of Fisheries & Wildlife - Ministry of Agriculture

Figure 6: Map of Lebanon showing Caza Sour

Figure 7: Fishing methods observed in Tyre Port

Executive Summary

Executive Summary:

The Lebanese Fisheries Governance Mode is identified as “Hierarchical”, like most classical governance modes with interactions between the state and its citizens. It is a top-down intervention style, which expresses itself in policies and in Law.

Fisheries Regulations which are the main drivers of fisheries governance policy are very clear to all parties even though some of the fishermen tend to “ignore” some of its provisions. Directly involved partners like local authorities and NGOs are familiar with it and all of the fishermen were positive towards knowing the Law general framework.

A new Law was drafted instead of the actual basic fisheries Law dating from 1929, which is marine fisheries, oriented; this new draft Law was forwarded to the parliament through the PM Bureau.

At local level, several efforts from the local municipality supported by locally active NGOs are put together, sometime in an informal manner in order to enforce the fisheries Law. These efforts are bearing fruits and are not subject to criticism at official level.

The fishing licensing system in Lebanon is governed by the Department of Fisheries and Wildlife (DFW) that issues the licenses for the fishing activities. Results of the survey revealed some difficulties in going through all the yearly procedures to obtain the fishing license; particularly citizen's charter; DFW developed a web-based licensing system already functional under a testing period and supposed to be adopted starting 2018.

At conflict level, relation between cooperative and the syndicate is in conflict status was not disclosed by any stakeholder. Tyre fishing port is informally managed and organized by the syndicate due to the conflict already mentioned where formally management of fishing ports is the responsibility of the respective harbormasters.

The participation of fisheries community in decision-making is rarely done and if ever it is at an informal level. But unfortunately, all respondents considered fishermen communities are not empowered (capable) to fully participate in co-management.

And other direct and indirect indicators related to Governance like research and others, were analyzed and discussed especially the monitoring and control system. With these indicators we were able to draw the Governance Map that expresses the relation, influence and interaction of these different stakeholders over the fisheries sector.

Finally we summarized a conclusion followed by recommendations that, if taken seriously at institutional level, could lead for a better governance and management of the fisheries sector in Lebanon in general and Tyre in particular and certainly help in the conservation of marine resources.

Overview

ADR is implementing the project ‘Fisheries Management for Improved Livelihoods of the Coastal Fishing Community in Tyre (South Lebanon)’ in partnership with IUCN as the project leader (International Union for Conservation of Nature) and funded by

the Swiss Foundation Drosos. The project duration is three years from January 2014 until January 2017.

Within the context of the sustainability of artisanal fisheries in Tyre, Lebanon, efforts are being made to understand how traditional fishermen can improve economic conditions for themselves and their communities through diversification from traditional fishing activities. This could provide supplemental and/or alternative opportunities for the fishing communities that would remove pressure from over-fished stocks, as well as provide new and exciting opportunities to improve economic returns.

ADR and IUCN ROWA (Regional Office for West Asia) have the overall objective of contributing to an increased level of social, economic and environmental development and deeper regional integration in the sustainable exploitation of fisheries resources. A Community-Based Fisheries Governance Framework is stipulated to be developed and operational under result 3.1 of the project. Thus, it is aimed to identify the formal and informal governance of the fishery sector in Tyre - South Lebanon and to develop a framework for community-based fisheries governance to be used by the Fisheries Syndicate in consultation with the local stakeholders. The idea is to understand as precisely as possible the way fishing communities are internally organized in South Lebanon and how they interact with other stakeholders, especially concerning the legal aspects and the formal legal governance framework for fisheries in Lebanon. The study of the two governance modes (formal and informal) will allow proposing a comparative analysis between the two frameworks. This analysis will also identify interesting aspects or gaps and suggest recommendations for the development of an effective “local governance system” or community-based governance system. Full text of the Terms of Reference for this activity can be found in Annex I of this report.

Mediterranean and Black Sea fisheries

Fleet

The General Fisheries Commission for the Mediterranean (GFCM) in its 2016 report *“The State of Mediterranean and Black Sea Fisheries”* indicated that the officially reported fishing fleet operating in the Mediterranean and the Black Sea comprises some 92,700 vessels. The eastern Mediterranean accounted for the largest share of vessels (28 percent) with Turkey, Greece, Italy and Tunisia being the countries with the largest fleets, accounting for more than 60 percent of the total number of vessels reported to the GFCM - while Lebanon’s reported share was 2.83% (2,623 vessels). Small-scale vessels, identified as polyvalent small-scale vessels up to 12 m length overall (LOA), are the dominant fleet segments, accounting for 80 percent of the total number of vessels with Lebanese fleet being the only “totally” artisanal fleet in the Mediterranean. The average construction year of vessels shows that the youngest fleets are found in Romania (18 years), Tunisia (19 years) and Bulgaria (21 years), while the oldest fleets are found in Albania (37 years in 2011), Slovenia (37 years), Croatia (34 years) and France (33 years). Lebanon also showed an aging fleet (31 years). The ageing of the fleet may be a matter of concern for safety, while the substitution of ageing vessels can also represent a problem for the increase in fishing capacity, if no rules are in place to regulate the entry of new vessels in the fishery.

Employment

Just under a quarter of a million people (221,797) are directly employed on fishing vessels in the GFCM Area. Besides being the most numerous, the small-scale fleet segments employ the highest number of fishers in the region (about 55 percent of the total number of people directly employed in fisheries in the GFCM area of application).

Landings

The above-mentioned GFCM (2016) report indicated that, in terms of total landings by weight, purse seiners are the most important fleet segments, while in terms of landing value, trawlers are the leading segment.

In the Mediterranean, landings continued to increase until 1994, reaching 1,087,000 tons, and subsequently declined irregularly to 787,000 in 2013. Algeria, Greece, Italy, Spain, Tunisia, Turkey and Ukraine are together responsible for slightly more than 80 percent of total landings in the Mediterranean and the Black Sea. A group of 13 main species accounts for some 65 percent of landings, with anchovy (393,500 tons) and sardine (186,100 tons) being by far the most dominant species. Lebanon's estimated landings are 3,574 tons (0.24%).

The total value at first sale of fish landings across the Mediterranean and the Black Sea region is approximately US\$3 billion, where Eastern Mediterranean share is around US\$1 billion, Lebanon contributing US\$23 million to this figure. It should be noted that fisheries present a more significant economic contribution to regional economies in the Eastern Mediterranean, compared with other sub-regions of the Mediterranean.

Five countries account for approximately 80 percent of the total landing value of GFCM fisheries: Italy, Turkey, Greece, Spain, and Algeria, in that order. Italy is the country with the highest landing value in the region (close to US\$900 million). Trawlers (12–24 m LOA), purse seiners (>12 m LOA) and polyvalent small-scale vessels with engine (6–12 m LOA) are the fleet segments associated with the highest landing value (US\$761 million, US\$549 million and US\$438 million, respectively).

Figure 1 shows the fleet numbers and employment in Eastern Mediterranean (FAO EastMed, 2016).

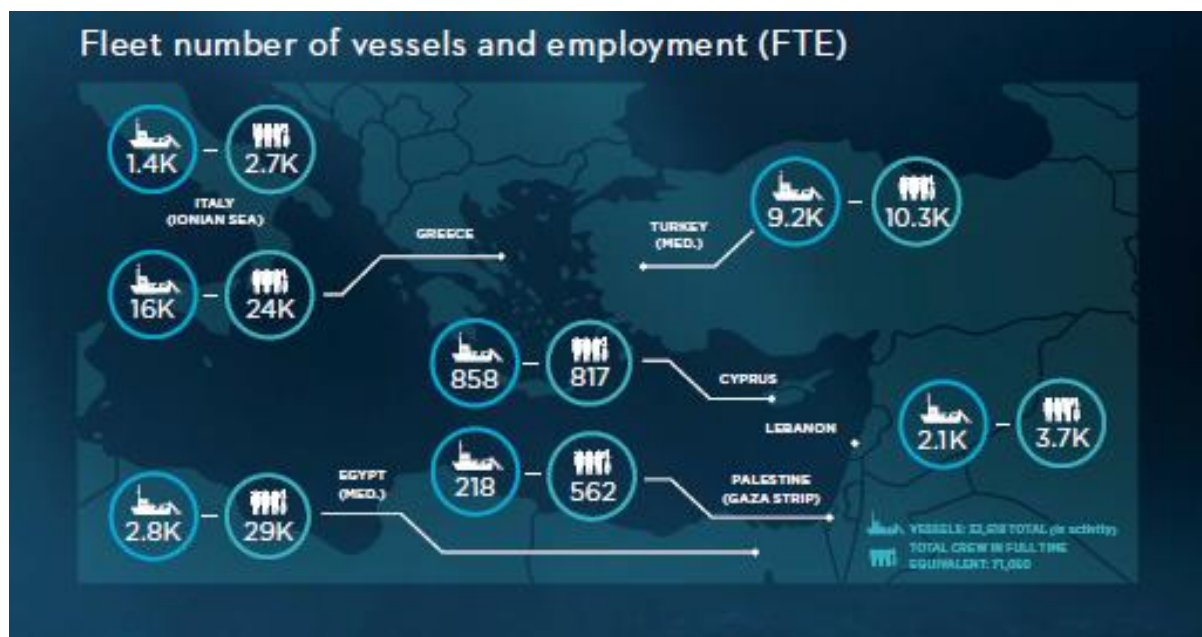


Figure 1: Eastern Mediterranean fisheries at a glance (FAO EastMed, 2016)

Status of stocks

Moreover, GFCM (2016) reported that about 85 percent of the assessed Mediterranean and Black Sea stocks are fished at biologically unsustainable levels. Demersal stocks experience higher fishing mortality rates, while small pelagic stocks show average fishing mortality rates close to the target. Hake stocks in the Mediterranean Sea show the highest fishing pressure, with a fishing mortality rate that is an average of 5 times higher than the target, and for some specific stocks, up to 12 times higher than the target. Conversely, small pelagic stocks show average fishing mortality rates that are close to the target, while for some specific stocks, the fishing mortality rate is estimated to be below the target.

Insights on small-scale fisheries

GFCM (2016) further reports that artisanal or small-scale fisheries in the Mediterranean and the Black Sea play a significant social and economic role: they constitute more than 80 percent of the fishing fleet, employ at least 60 percent of those workers directly engaged in fishing activity and account for approximately 20 percent of the total landing value from capture fisheries in the region. Despite its importance, the sector has historically lacked an integrated strategy for its monitoring, management and sustainable development. Furthermore, they are strongly anchored in local communities, reflecting often historical links with traditions, culture and values. Small-scale fisheries are a vibrant and multi-dimensional sector, where traditional local knowledge and cultural heritage coexist and are embedded in the surrounding environment. Moreover, they are important vectors of local knowledge and good practices and they have a relatively low environmental impact. Small-scale fisheries encompass a large number of fishing techniques, using more than 50 types of fishing gear, and they target numerous species, adapting to fishing seasons based on a rotational system. They are often family-based and linked to other sectors, such as food related services and tourism.

Building upon the participatory approach used for the development of the FAO SSF Guidelines, the *First Regional Symposium on Sustainable Small-Scale Fisheries in the Mediterranean and the Black Sea* was organized (Malta, 27 to 30 November 2013) by the GFCM, in partnership with FAO and other organizations.

Small-scale fisheries are affected by a wide range of possible conflicts in the region. These are mainly related to competition with industrial fisheries for target species, space and markets, but also include aquaculture, other coastal users (e.g. the tourism industry, pollutant industries) and administrations (e.g. construction of big ports and other infrastructures). Another regional conference *Building a future for sustainable small-scale fisheries in the Mediterranean and the Black Sea* was held on 7–9 March 2016 in Algiers, Algeria.

The Malta Symposium (FAO, 2013) showed that for many small-scale fishers and fish workers, the sector represents a way of life and embodies a diversity and cultural richness that is of global significance. The sector is diverse and dynamic and its characteristics vary from one location to another. It tends to be strongly rooted in local communities, reflecting their traditions and values. Many small-scale fishers and fish workers (employed in associated jobs, in particular in fish processing, distribution and marketing) are self-employed and engaged both in directly providing food for their household and in commercial fishing, processing and marketing. The family not only offers support to fishers, but also often provides the human capital needed for basic fishery-related activities. The active role of women in small-scale fisheries in GFCM countries is significant, and often fundamental. Small-scale fishers are usually organized in different types of professional and producer organizations or cooperatives.

There is consensus in the region that participatory management and multi-level governance approaches are necessary to strengthen small-scale fisheries in the Mediterranean and the Black Sea.

Some experiences have shown that the co-management approach has already been adopted successfully in the Mediterranean and the Black Sea e.g. on the Mediterranean coast of France; professional organizations of fishers, known as *Prud'homies*, have been present since medieval times and currently comprise large numbers of small-scale fishers, who together work on more than 1,500 fishing vessels.

Lebanon: Fisheries country profile

a- Country brief

Lebanon is a predominantly mountainous country, with a population of around four millions inhabitants. The Lebanese coastline is 220 km long. Bottom grounds are mainly rough with intensive rocky patches. Lebanon has also a large hydrological network of 2,000 rivers including a dozen running through the Lebanese coast and that consequently play an important role in the quality of marine coastal waters. The coastal zone has a very high population density as 55% of the total population lives there, across a territory that hosts 33% of all built-up areas (GFCM, 2014).

The Lebanese continental shelf is narrow; less of 1,200 km² to 200 m depth (FAO EastMed, 2011) and rarely extends beyond an 8 km strip from the coast, except

for North Lebanon (GFCM, 2014). Bottom grounds are mainly rough with intensive rocky patches, good for stationary demersal gear (Figure 2).

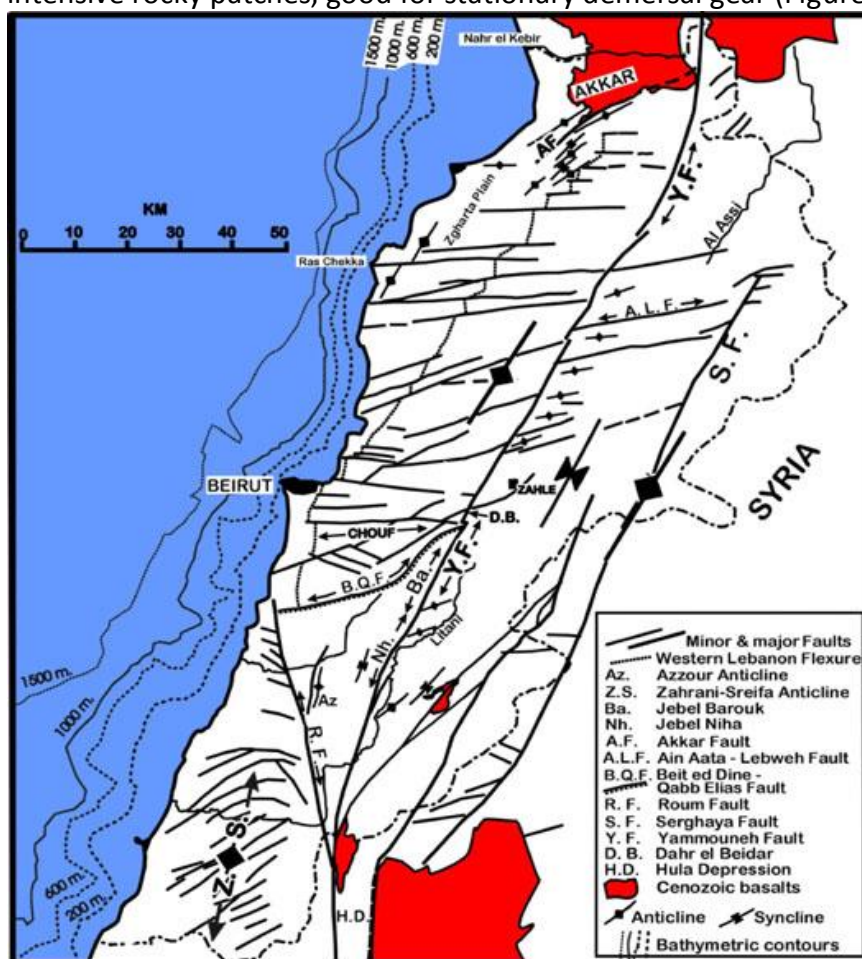


Figure 2: Continental shelf and bathymetric contours of the Lebanese coast (IMAC 2007)

According to the draft/unpublished FAO Fishery and Aquaculture Country Profile (FACP) (Majdalani, 2013), Lebanon has a coastline of 220 km, with urban areas stretching over 50 km of the coast. The contribution of the fishery sector to the national economy remains very limited (US\$30,3 million in 2011 as reported by Pinello & Dimech in 2013). Lebanon started reporting to FAO fisheries catch data in 2014 (2,998 tons in 2014 and 3,483 tons in 2015) based on the system developed by FAO EastMed Project. The fishing industry is reliant on the exploitation of small pelagic species. Fisheries in Lebanon are small-scale fisheries and are based on bottom stationary gear (trammel nets and longlines), purse seiner nets (lampara) and beach seiners. Fishing operations, with the exception of longlines, are mostly carried out at depths of up to 50 m. Most of the fishing nets have small mesh sizes, i.e. less than 2x2 cm (Majdalani, 2005). The national production is almost entirely consumed locally.

Overall, Lebanon is a significant net importer of fish and fishery products. The demand for fish in Lebanon is high (around 26,500 tons) with imports of fresh, chilled, and frozen fish reaching 21,100 tons in 2011 as shown by the Lebanese Customs data (2013). The apparent per capita seafood consumption in 2011 was

6,03 kg (Pinello & Dimech, 2013), but is still well below the world average of about 17,8 kg (GFCM, 2016).

The Lebanese coast is subject to intense pressure from urbanization, fishing, shipping, and other related marine-based industries. Thus, emphasis needs to be given to strengthening coastal zone management and protecting the marine environment. Industrial activity in coastal areas of Lebanon continues to be a significant source of contaminants into main fishing areas, but legislation is being put into place to reduce levels of contamination. The lack of related enforcement capabilities remains an important issue.

Lebanon is a party to the 1982 UN Convention on the Law of the Sea and to the UN Compliance Agreement since 1995. Lebanon is also an active member of the General Fisheries Commission for the Mediterranean GFCM (Majdalani, 2013).

The local production is due to an estimated number of 6,500 fishers using about 2,662 small boats of an average 7-meter length, working in 44 fishing ports/landing sites (Figure 3) along the coastline (Majdalani, 2004). Furthermore, most fishing ports are small in size and need rehabilitation/extension/construction, navigation tools, lifting equipment and refrigeration facilities.

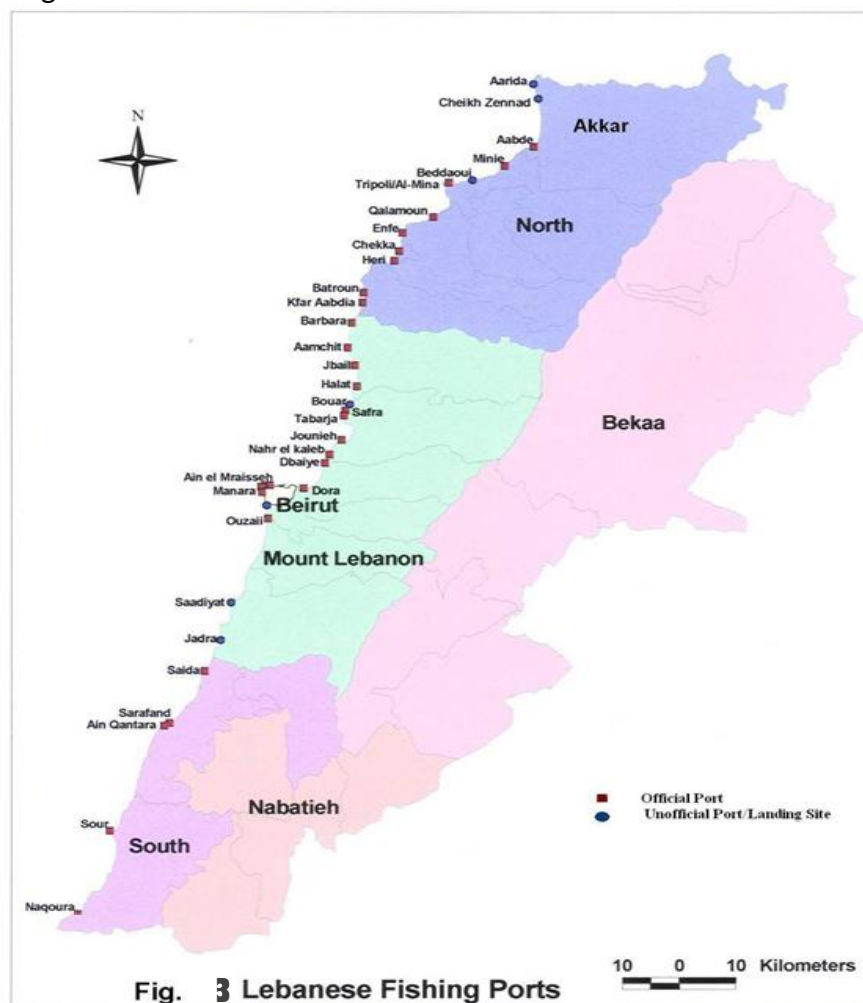


Figure 3: Main fishing ports in Lebanon (Majdalani, 2005)

Most fishing vessels are made mainly of wood and often without electronic equipment (e.g. GPS, fish finder) and in almost all cases, the gear is operated by hand (Brême, 2004). According to the national law, and also for safety reasons, fishing activity is restricted to 6 nautical miles from the coast.

This concentration of efforts on a narrow coastal strip has led to an overexploitation of coastal species. The yield reduction paved the way for the recurrence of harmful practices, such as the use of small mesh and hooks and explosives, which thrive as a result of an outdated legislation and the lack of enforcement (Sacchi & Dimech, 2011).

Another adverse anthropic impact on the coastal ecosystem is that of marine pollution, resulting from problems of urban and industrial waste management and the lack of an effective sanitation network. Most of Lebanese industries are located besides the rivers and without efficient wastewater treatment plans for the various sources of industrial pollution (fertilizers, food industries, mills, tanneries and textile industries, oil refineries, etc.), thus dumping into the sea as a result of torrential floods (C.E.D.R.E, 2002; Nassif, 2004; Hourri & El Jeblawi, 2007). On the other hand, the Lebanese coastal zone is densely populated around coastal slums in major cities (MoE-UNDP, 2010). Nevertheless, in general terms, there are moderate inshore eutrophication and heavily eutrophied local systems. In the south and north of the Lebanese coast, where the human settlements are scattered and modestly inhabited, there is in principle no risk of substantial eutrophication (Abboud Abi Saab et al., 2008; World Bank, 2009).

The management of the Lebanese fisheries and aquaculture sectors is the responsibility of the Ministry of Agriculture, which includes a Department of Fisheries & Wildlife. At local and professional level, the fisheries sector in Lebanon is represented by about 33 fishermen cooperatives and 86% of the 9,000 fishers hold a personal license. There is no national collective labor agreement and there are seven fishermen syndicates/unions representing fish workers.

Scarcity of financial resources and clear and effective policy management have led to neglect the potential of the fishery and aquaculture sectors and induced a gradual decline in their productivity as well as that of the standard of living for fishermen and fish workers involved in ancillaries activities.

On the other hand, the limited knowledge of market and fish consumption patterns or potentialities in new harvested or cultivated products, together with the lack of a strategic vision to define priorities, hamper the creation of job opportunities.

b- General geographic and economic indicators

Area:	10,452 km ²
Shelf area:	1,200 km ²
Length of continental coastline:	220 km
Exclusive Economic Zone:	Decree 6433 on 1/10/2011 - "Delimitation of the Lebanese Exclusive Economic Zone"
Population (2011):	4,259 millions

GDP per head (2011):	\$9,904
Agricultural GDP (2011):	\$2,63 billions
Fisheries GDP (2011):	\$ 30,3 millions

Table 1: General geographic and economic indicators (Source: Pinello & Dimech, 2013; FAO, 2013)

c- Ecological context

Carpentieri & Colloca (2005) indicated that the Levantine Sea is a sub-basin located in the south-eastern corner of the Mediterranean, covering the area bordered by Crete, south of Turkey, Syria, Lebanon, Palestine, Egypt and part of Libya, including Cyprus. In front of the Nile Delta (off Port Said at the entrance of the Suez Canal), the shelf widens to 130 kilometers. This area is characterized by very low production and oligotrophic conditions. The high temperatures prevailing in the eastern Mediterranean, especially compared to its western basin, give this region a tropical character with regard to planktonic biota.

Within the Mediterranean, there is a gradient of increasing species diversity from east to west. The number of species among all major groups of plants and animals is much lower in the eastern Mediterranean than in the western and central parts of the sea. The southeast corner, the Levant Basin, is the most impoverished area.

They further commented that such poor biodiversity of the Levantine basin and Lebanon Sea has begun to increase since the opening of the Suez Canal in 1869. During the past decades, at least 300 Indo-Pacific species, known as Lessepsian migrants, have entered the Levantine basin giving to its communities a mixed Mediterranean-Red Sea species composition. About 60 Red Sea species have successfully colonized the Levantine basin, some of them replacing native species, thus becoming important components of commercial fisheries.

d- Marine fish catch profile

MOA catch data for 2015 indicated that 20 species accounted for 80% of the catch and that sardines and anchovies (Clupidae) are the most important species representing more than 25% of production. It should be noted that these figures are the result of a pilot activity conducted by FAO EastMed Project, which is undergoing review for possible amendment; thus, the figures might not be accurate and presented for indicative purposes only (DFW 2016, personal communication).

Table 2 below shows Lebanon estimated catch data for 2015.

2015 Fish Species annual totals: Ranking and cumulative percentages			
Species	Catch (tons)	Percent of catch	Cumulative percentages
Clupeidae [Herrings, Sardines nei] سردين	1,033.20	14.10%	14.10%
Euthynnus alletteratus [Little tunny] بلميدا	687.4	9.40%	23.60%
Pagellus acarne [Axillary seabream] ذكر جريدي, نقط	607.9	8.30%	31.90%
Diplodus sargus [White seabream] صرغوص, فليسات	514.1	7.00%	38.90%
Siganus rivulatus [Marbled spinefoot] ابو شوكة ابيض, مواسطة, عقيص	463	6.30%	45.30%
Pagellus erythrinus [Common pandora] جريدي	302	4.10%	49.40%
Liza aurata [Golden grey mullet] بوري دهبان, سيلوني	256.1	3.50%	52.90%
Pagrus caeruleostictus [Blue spotted seabream] فرفور, احمر, فريدي	242.3	3.30%	56.20%
Lithognathus mormyrus [Sand steenbras] مرمور	213.1	2.90%	59.10%
Sardinella aurita [Round sardinella] سردين, رنغا مرقطة	210.1	2.90%	62.00%
Oblada melanura [Saddled seabream] منوري	201.3	2.80%	64.80%
Seriola dumerili [Greater amberjack] جرو انتياس, زرزور	191.5	2.60%	67.40%
Sphyrna sphyraena [European barracuda] سفرنا	191.2	2.60%	70.00%
Sphyrna chrysotaenia [Yellowstripe barracuda] مليفة, زعرا	147.3	2.00%	72.00%
Siganus luridus [Dusky spinefoot] ابو شوكة اسود, مواسطة, بلشفيك	139.4	1.90%	73.90%
Boops boops [Bogue] غيص	130.7	1.80%	75.70%
Caranx crysos [Blue runner] تراحول	119.6	1.60%	77.40%
Trachinotus ovatus [Pompano] عطوط	110.7	1.50%	78.90%
Portunus pelagicus [Blue swimming crab] سلاطين	105.5	1.40%	80.30%

Furthermore, data for catches by vessels categories (according to GFCM categories) and fishing gear showed that the category of vessels with LOA 6-12 m catches 80% of fish.

Table 3 below shows Lebanon data for catches by vessels categories.

2015 vessel category annual totals: Ranking and cumulative percentages			
Vessel category LOA/fishing gear	Catch (in tons)	Percent of catch	Cumulative percentage
6-12 m Gillnets/Entangling nets	2,882	39.40%	39.40%
6-12 m Surrounding nets	1,608	22.00%	61.50%
6-12 m Hooks and lines	1,341	18.40%	79.80%
0-6 m Hooks and lines	630	8.60%	88.40%
0-6 m Gillnets/Entangling nets	316	4.30%	92.80%
6-12 m Pots and traps	268	3.70%	96.40%
Large boats: Surrounding nets	185	2.50%	99.00%
0-6 m Pots and traps	76	1.00%	100.00%

e- Fishing practices/systems

Fishing vessels are almost entirely the multipurpose artisanal crafts of the Eastern Mediterranean known locally as Flouka (a small 3-15 m fishing craft, made of wood (78%) and/or fiberglass (15%); shapes are diverse, generally undecked and with/without inboard or outboard engines) (Majdalani, 2005).

In 2015, the average fishing vessel length of licensed fishing vessels was 7.2 m and the fishing vessels length distribution as reported by DFW in 2016 is shown in Table 4.

Table 4 below shows Lebanon fishing vessels length distribution (DFW, 2016)

Fishing vessels length class	Number of vessels
<6 m LOA	546
6-12 m LOA	1,420
12-18 m LOA	39
Total	2,005

Fishing techniques are mostly based on passive gears such as gillnets, trammel nets, longlines, and purse seiners (Sacchi & Dimech, 2011). Fishing operations, with the exception of longlines, are mostly carried out at depths of up to 50 m. Most gillnets and trammel nets have small mesh sizes (<2x2 cm). Gillnets represent more than 50% of the fishing gears used in Lebanon (Majdalani, 2005). Data of 2004 (Majdalani, 2005) showed that most vessels (78%) were undecked with an average GRT of less than 5 tons. Around 92% were motorized mainly with inboard diesel engines (75%). Few vessels have GPS, while the rest have very limited navigational or safety equipment (Majdalani, 2004; Sacchi & Dimech, 2011). Although the construction of the vessels is quite good, they are not built to face rough seas, fish in offshore waters and are not equipped to keep the catch in good conditions (Sacchi & Dimech, 2011). The fleet is built

almost exclusively for small scale and inshore activity, with some vessels equipped with old low quality echo sounders to detect fish. Their net winches are not fitted to haul gillnets deeper than 50 m, without the risk of damage or loss of the gear (Sacchi & Dimech, 2011).

f- Main resources

There is no regular stock assessment carried out in Lebanon. The first studies were carried out in 2011/2012 as part of a research for a Master's degree. The methodology adopted was length-based single species stock assessment. Stocks of Boops boops and Diplodus sargus sargus were assessed by the University of Balamand. Assessment showed that B. boops is overfished unlike D. sargus sargus in North Lebanon (Bustani, 2012).

Bariche et al. (2006) study on small pelagic fishery indicated that most of landed fishes were juveniles and the length frequency distributions showed that the dominant sizes were 6-8 cm total length, which is smaller than the minimum size fished in neighboring Mediterranean countries. Sacchi & Dimech (2011) also highlighted the presence of juvenile fish in the landings, for most fishing gears have small mesh and hook sizes. This could be a signal of growth overexploitation. Furthermore, all the effort of the fleet is concentrated mainly within the 6 nautical miles leading to a high fishing pressure on the coastal fisheries resources particularly the <3 nautical miles zone (Bariche et al., 2006; Sacchi & Dimech, 2011; Colloca & Lelli, 2012).

The status of fish stocks beyond the 6 nautical miles is not known, but they can be considered as virgin stocks. Although it is illegal to fish beyond the 6 nautical mile limit, Lebanese fishing vessels are not equipped to fish beyond the 6 nautical miles (Sacchi & Dimech, 2011).

A short offshore survey by Colloca & Lelli (2012) in South Lebanon, showed that hake was the most abundant species caught by gillnets. The Spanish traps for the soldier shrimps returned mean CPUEs of 210-310 g/trap/day. These results are preliminary but insights that fishery resources exist in deeper waters.

g- Management measures and institutional arrangements applied to main fisheries (Majdalani, 2013)

- Technical measures

Closed season:

- Purse seines: January 1 - April 15
- Fyke nets: May 15 - September 15

Closed areas:

- Ban of fishing within 500 m from coastline

Fishing gear

- Beach seiners: banned
- Air compressors: banned
- Mesh size control: minimum mesh size 2x2 cm except for purse seiner nets that can be of lower mesh size

- Nature reserves:

- Palm Islands (North Lebanon)
- Tyre Coast

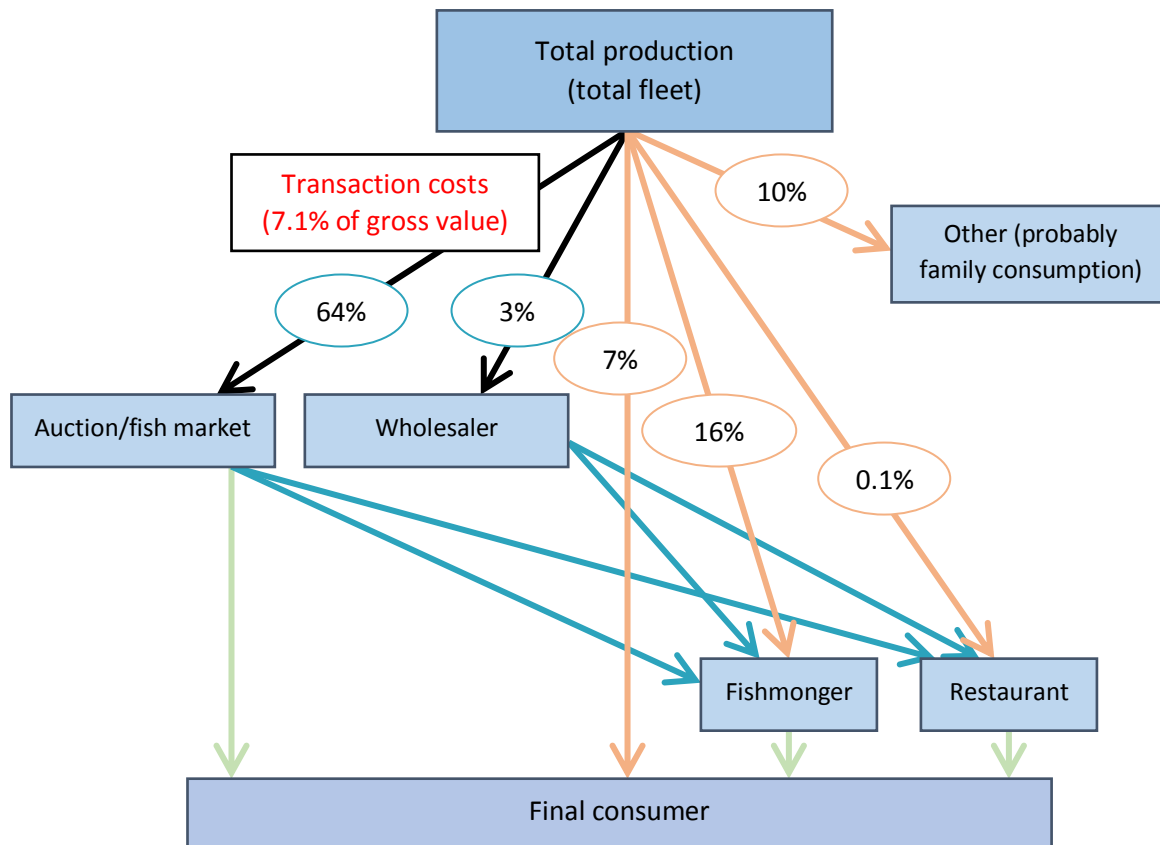
- Establishing fisheries restricted area at Oceanographic & Fishing Institute in North Lebanon
- Economic incentives:
 - Taxes: no taxes levied on fisheries products
- Other measures:
 - Establishing "minimum landing size" for many commercial species
 - Regulation of Fyke Nets
 - Ban on fishing, sale and consumption of *Lagocephalus* species

h- Fish utilization

Local production is sold fresh for human consumption. Recently, some private initiatives were launched to fillet and smoke part of local rainbow trout production. The shrimp farm is the only business that freezes its products (Majdalani, 2013).

Around 67% of the first sales occur through indirect sales, while 23% through direct transaction. Nearly 64% of indirect sales pass through the auction markets (Pinello & Dimech, 2013). Figure 4 shows the flow of the first sale dynamics.

Figure 4: Main first sale market (ex-vessel) channels for production in Lebanon



i- Fish markets

The per capita seafood consumption in 2011 was 6.03 kg, which is about one third of the average figure for the Mediterranean in 2005 (Pinello & Dimech, 2013).

In 2005, there were fish halls for sorting, packing, selling and icing fish at 16 port/landing sites along the Lebanese coast. There were fish auctions at the ports of Dora, Ouzaii, Saida, Tripoli and Sour (Majdalani, 2005; PescaMed, 2011).

Local fish production is marketed to consumers, besides auctions, on port stalls, by licensed and/or unlicensed shops/supermarkets and fish stalls, directly by fishermen and by street vendors. Smoking and filleting of about 300 tons/year of salmon (imported) and trout, and freezing of around 20 tons of shrimps is practiced. The only canning plant in Lebanon was decommissioned due to a lack of supply of sardines and tuna (Majdalani, 2005). No market survey on consumption patterns was ever conducted. The Central Fish Market (Quarantina-Beirut) attracts fish from all over Lebanon and most imported fishes.

j- Socio-economic contribution of the fishery sector

Role of fisheries in the national economy

Lebanon is a small upper-middle income country, with a GDP per capita of US\$ 9,904 (Table 5). Around 88% of its population (4 to 4.6 million) is urban (FAO, 2006). World Bank estimated the population to be 5.8 million in 2015.

Table 5: Socio-economic indicators

Characteristics	2011
Total population	4.259 millions
Median age	30.4 years
Total labor force (TLF)	1,481 million
Income level	Upper middle income
GDP per capita (USD)	9,904
Agriculture as % of GDP	6.24%
Official minimum wage per month (USD)	448
Average household size	4.27

(Source: Pinello & Dimech 2013)

Agriculture plays a minor role in the economy. In 2014, it contributed to about 7.2 percent of the GDP (World Bank, 2016), meeting about 30% of the domestic food demand. Marine capture fisheries comprise about 0.06% of GDP (Pinello & Dimech, 2013).

Pinello and Dimech (2013) indicated that the backbone of the marine fisheries sector -in terms of fleet capacity, activity and employment- is the 6-12 m LOA vessels. The fleet landed around 4,850 tons (valued at US\$27 million) in 2011 (cf. Table 6). The fishing industry generated a net profit of US\$6.4 million (24% profit). The revenue of the fleet provided an annual salary of about US\$ 3,000/fisher to about 3,229 fishers and a gross income of US\$7,400/fisher-owner. However, the fisher and fisher-owner incomes were respectively 20%

and 70%, lower than the national GDP per capita. Furthermore, the fishers' income is 45% less than the minimum wage of the country.

Table 6: Economic performance of the Lebanese fishing fleet in 2011

Total fleet			
Variable	Value	Average per Vessel	
Revenues			
Value of landings (\$1,000)	26,979	18.5	
Employment			
Employment on board (Total)	3,229	2.2	
Costs (1,000)	As % of Revenues		
Energy costs	4,159	15%	2.8
Maintenance costs	1,295	5%	0.9
Operational costs	1,784	7%	1.2
Commercial costs	1,969	7%	1.3
Fixed costs	78	0%	0.1
Crew share (salary)	9,834	36%	6.7
Total operating costs	19,119	71%	13.1
Depreciation	1,207	4%	0.8
Interest (opportunity costs)	197	1%	0.1
Economic performance			
Gross cash flow (\$1,000)	7,860	29%	5.4
Net profit (\$1,000)	6,455	24%	4.4
Gross value added (\$1,000)	17,694	66%	12.1
Return on investment (ROI)	50%		
Break-even revenue	26,106	103%	17.9
Salary per crew (\$1,000)			3.0
Capacity			
Volume of landings (1,000t)	4,850		3.3
Fleet - number of vessels	1,460		
Invested capital (\$1,000)	13,410	50%	9.2

(Source: Pinello & Dimech 2013)

Around 88% of owners operated their own vessel, and fishing was the main income generator for 81% of vessel owners. Table 7 shows that there were differences among fleet segments (Pinello & Dimech, 2013).

Table 7: Social characteristics of the skipper and fishers by fleet segment

	Minor gear with engine < 6 m	Minor gear with engine 6-12 m	Purse seiner 6-12 m	Total fleet
Ownership %				
Owner engaged in the vessel (%)	94	87	80	88

Fishing as main income generator (%)	82	80	92	81
Skipper – average values				
Age (yr)	49.1	47.7	46.1	47.9
Household size (n)	4.0	4.9	7.1	4.9
Household members engaged in fishing (n)	1.0	1.2	2.1	1.2
Average age of children (n)	17.9	16.8	16.5	17
Fishers				
Age (yr)	35.1	37.5	33.3	36.8

(Source: Pinello & Dimech 2013)

Furthermore, while the average household size was 4.9 people, only 1.2 of them were engaged in the fishing activity. The educational level of both the skippers and the children were significantly higher than what is compulsory in the country (elementary).

k- Employment

Data on full-time and part-time fishers are not available. 2004 data showed that there is a minimum of 4,475 fishermen operating the fishing fleet, whereas the usual number is 6,480. This number increases to 9,575 fishermen during peak season. Practically all the fishermen (99.9%) are Lebanese (Majdalani, 2005). Moreover, 2012 data indicated that the marine fisheries sector employed 3,200 people (Pinello & Dimech, 2013).

The greatest part of the fishers is found in the northern region of Lebanon. There is neither a contract of employment in Lebanon nor any social security cover, which could protect them in case of disability, loss of employment and retirement (PescaMed, 2011).

l- Institutional framework

The management of Lebanese fisheries is the responsibility of the Ministry of Agriculture, which contains the Department of Fisheries & Wildlife that governs the sector assisted by the regional decentralized Departments of Rural Development. Below is the organizational chart (Figure 5) of the fisheries related entities at the Lebanese Ministry of Agriculture (Majdalani, 2013).

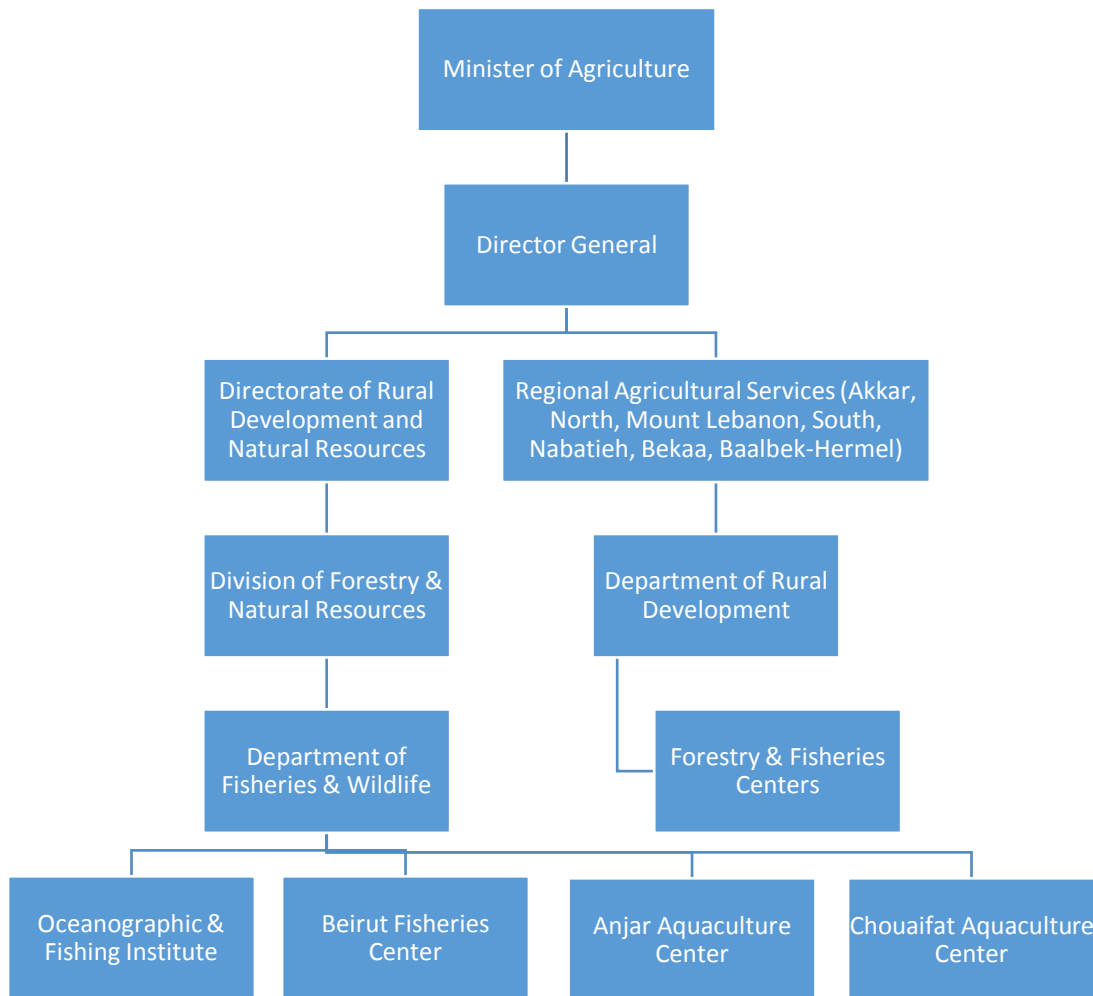


Figure 5: Organizational Chart of the Department of Fisheries & Wildlife - Ministry of Agriculture
(Source: Majdalani, 2013)

m- Strategic development plans for the fisheries and aquaculture sectors

- International context:

- **Strategic roadmap in support of fisheries & aquaculture in Lebanon:** Following a request for technical assistance by the Lebanese Minister of Agriculture, the General Fisheries Commission for the Mediterranean of the FAO, together with the FAO Regional Project EastMed, has spearheaded an initiative aimed at carrying out concerted actions in support of the development of fisheries and aquaculture in Lebanon. This culminated in the draw up of a multiannual **“Strategic Roadmap in support of Fisheries & Aquaculture in Lebanon”** in 2014.
- Donors meeting: The Donors’ Forum (organized by GFCM, FAOR Lebanon and MOA) in support of the *Strategic roadmap for the development of*

the Fisheries and Aquaculture in Lebanon was held in Beirut on Tuesday 28, October 2014. It was attended by representatives of a number of embassies, international organizations, NGOs and other interested bodies. However, the meeting did not mobilize support to the sector.

- Local context: the fisheries/aquaculture sections of MOA 2015 – 2019 Strategy (MOA, 2017) were based upon the GFCM/FAO/MOA “**Strategic Roadmap in support of Fisheries & Aquaculture in Lebanon**”. It focuses on “supporting investment in the fisheries and aquaculture and improving sustainable management of the sector and the implementation of the strategic roadmap for the development of the sector” through:
 - Strengthening the legislative and regulatory framework of fishing and aquaculture
 - Promoting research and elaboration of development plans
 - Fisheries development
 - Aquaculture development
 - Development of information collection system.
- Legal and administrative frameworks:

The MOA was created in 1943. Within it, the DFW is responsible for the management of the fisheries sector. Decree No. 5246 “Organization of Ministry of Agriculture” issued on 30/6/1994 defined the role of DFW that included, among others:

 - Marine and freshwater fisheries and game hunting affairs
 - Applied research on aquaculture and establishment of training centers in different locations and at its Oceanography & Fisheries Institute at Batroun.
 - Fishing licenses
 - Establishing and modernizing fishing ports and fish handling facilities in coordination with the Ministry of Transportation
 - Regulating the fishing sector by assigning fishing seasons and protected areas
 - Organizing and regulating diving clubs and protected areas
 - Improving the livelihood of fishermen by organizing cooperatives and syndicates
 - Carrying applied research on aquaculture.
 - Developing and modernizing fishing techniques.
 - Providing training on fishing boats
 - Preparing extension programs

Furthermore, the MOA owns the Oceanography and Fisheries Institute at Batroun as well as the Anjar & Chouaifat Aquaculture Centers. In addition, it provides technical support to regional Departments of Rural Development and the Forestry and Fisheries centers (DFW-MOA; personal communication).

The first law regulating the fisheries sector is Law No. 1104 (issued by Decision) on 14/11/1921. Since 1921, several laws, decrees and decisions related directly to fisheries were promulgated, with the most relevant being

Law No. 2775 “Monitoring of coastal marine fishing” passed in 1929. This law manages the fishing sector by:

- Identifying fishing – Delimiting coastal fisheries – Monitoring coastal fisheries – Designating staff.
- Various prohibitions – Prohibited places – Prohibited times – Types of overfishing.
- Fishing gears – Prohibited gears.
- Measures related to the organization and monitoring of fisheries and fishing by several vessels.
- Special provisions related to safeguarding juvenile fish and conservation of fish and shellfish - Minimum sizes of fish and shellfish to be fished, transported and sold.
- Prohibited baits – various prohibitions.
- Arrangements and precautions related to fishing operations.
- Measures for practicing fishing by rod and line.
- Fees for fishing licenses and fishing gears.
- Penalties.

A number of Ministry decisions were also issued that cover a variety of fisheries and conservation matters. Annex II lists, in chronological order, all Lebanese regulations that pertain to the fisheries sector.

Furthermore, a new Fisheries and Aquaculture Law was drafted by FAO, GFCM and MOA. It was discussed by some stakeholders. The draft law was sent to the Council of Ministers for approval and forwarded to the Lebanese Parliament for discussion and ratification.

n- Nature reserves

Seven nature reserves have been established in Lebanon by laws and one by ministerial decision, aiming at the protection of endangered species and the conservation of their habitats covering nearly 5% of the overall area. A “national maritime protected zone at the Oceanographic & Fishing Institute in Batroun” was established by the Ministry of Agriculture by Decision 129/1 of 1991; one marine nature reserve was established in north Lebanon called “Palm Island, Sannani Island and Ramkeen island” through Law 121 of 1992, and Law 708 of 1998 resulted in the “Establishment of Tyre Coast Nature Reserve in Jaftlak Ras Al Ain – Tyre Real Estate Zone” known as Tyre Coast Nature Reserve (MOE, 2017).

MOE explains that **Tyre Coast Nature Reserve (TCNR)** is not only a Nature Reserve but also a Ramsar site. It is located in southern Lebanon expanding over 380 ha, and remains the largest sandy beach in Lebanon. Besides its importance for visitors’ entertainment, Tyre Coast Nature Reserve harbors many species of plants, animals and insects. It is a nesting site for the endangered loggerhead and

green sea turtle and the shelter of the arabian spiny mouse and many other important creatures.

Tyre Coast Nature Reserve is of a particular importance for the following purposes:

- Fresh water estuaries and springs that outflow to the sea thus creating fresh/marine water interface
- Habitat for sea turtles
- Last and largest remaining sandy beach in Lebanon

It is divided into three main zones:

- 1- A beach zone
- 2- A high conservation zone that includes the Phoenician springs of Ras El Ain.
- 3- A large area for agriculture

Tyre Coast Reserve is cut into two segments by the Rashidiyeh Refugee camp. Access to the Ras al-Ain beach part is limited since it disturbs wildlife. This section provides a freshwater habitat and the off-flow creates small areas rich in frogs and other amphibians. The Law 708 indicates that the TCNR includes the territorial water along its sandy beach. It is to be managed by a special Committee appointed by the Ministry of Environment that includes representatives from the Municipality of Sour, environmental NGOs and the Ministry of Agriculture. The committee can appoint rangers to enforce the law.

Caza Sour

a- Geographical & administrative perspective



Figure 6: Map of Lebanon showing Caza Sour

(Source: Wikipedia, 2017)

- South Governorate/Mohafazat (Arabic: الجنوب; transliterated: al-Janub) is one of the eight governorates of Lebanon. South Lebanon has a population of around 500,000 inhabitants and an area of 929.6 km². The capital is Sidon. Temperatures can drop to 4°C during winter with a lot of rain and snow on the higher ground. In the humid summer, temperatures can rise to 30°C in the coastal areas. The governorate has several rivers: the Litani, Zahrani, Naqura, Awali, Qasmiye, and Hasbani. The area is famous for its citrus and banana farms. Its main cities are Sidon, Tyre and Jezzine (Wikipedia, 2017). Tyre (Sour) District (kaza, caza, qadaa, قضاء (ar)) is one of three districts of the South Lebanon Governorate. Its administrative center is located in the historic city of Tyre (Sour), one of the oldest coastal cities of the Mediterranean Basin. Tyre (Sour) has a sandy coastline considered one of the most beautiful and largest of Lebanon (localiban, 2017). In addition, its surface area is 418 km². It has a coastal strip from the Litani River north to the international border in the South. The coastal strip includes a fertile agricultural plain, in this plain, spread of banana plantations and citrus fruits form a significant part of the production at the national level. Tyre (Sour) District is bounded on the north by Saida (Sidon) District, on the east by Bent Jbayl District and on the south by the international border. Its population is estimated at 178,920 inhabitants, equivalent to 4.2% of the total population of Lebanon spread over large number of cities with more than 15,000 inhabitants, such as Jouaiya and Maarakeh.

There are 67 towns and villages with or without municipalities in Sour Caza, of which 28 are members of the Federation of Tyre (Sour) District Municipalities (Localiban, 2017).

In addition, there are three Palestinian Refugees Camps operated by UNRWA in Sour vicinity namely El Buss Camp, Rashidieh Camp and The Burj Shemali Camp that house around 70,000 registered Palestinian refugees (UNRWA, 2017).

b- Agriculture

The 2010 General Agriculture Census indicated that around 125 square kilometers are devoted to agriculture. Around 66% of the active population works in this sector. Other agricultural activities include dairy, poultry, and horse farms as well as beekeeping (MOA, 2010). Fisheries sector was not included in the above-mentioned agriculture census.

c- Fisheries sector

Fishing is definitely an old profession and way of life in South Lebanon. The “fish of Sour” (samkit Sour) is well renowned and appreciated. At present, there are two fishing ports in the Caza of Sour; namely Sour (Tyre) and Naqoura. Although most fishermen live in those communities, some belong to other towns/villages of the region.

- Legal status of fishermen: In 2015, DFW data indicated there were only 55% licensed fishing vessels in Sour and none in Naqoura; although the 2004 Fishing Vessels Census (Majdlani, 2005) indicated that there were 224 fishing vessels in Sour (three vessels operated then from the marina of the Tyre Rest House) and 15 fishing vessels in Naqoura. According to MOA figures (Majdalani, personal communication), the number of licensed vessels in Sour region was 257 in 2013 and only 55 in 2004. However, not all vessels are licensed to fish, but it is assumed that practically all are operational.
- Characteristics of vessels:
 - Type: Almost all vessels are Flouka-type (a small fishing craft of varied sizes ranging from 3 to 15 m and made of wood, wood covered with fiberglass or fiberglass).
 - Vessel construction place and year: Majdlani (2005) indicated that in 2004, 174 of Sour fishing vessels were constructed in Sour while the rest were constructed at other locations like Saida and Tripoli. Almost all were wooden and constructed between 1942 and 2004 with an average age of 26 years for the vessels in 2004.
 - Vessel size: the average LOA was 7.62 m in 2004, 7.58 m in 2013 (DFW, 2014), and 8.03 m for the licensed vessels in 2015 (DFW, 2016). The range for 2015 was 3–10.3 m. The figures of 2013 indicated the presence of 40 vessels smaller than 6 m LOA and 2 vessels with LOA greater than 12 m (13 and 13.97 m).
 - Vessels weight: the available data (for 74 vessels in 2015) was 1,503 tons, while GRT was estimated to be 968 tons in 2004.

- Engines: Two vessels were not motorized; three had outboard engines while 133 vessels had inboard engines in 2015. The number of non-motorized vessels was 26 in 2013. The total horsepower for Sour was 4,586 in 2015. In 2004, the horsepower was 6,275 with 219 vessels with inboard diesel engines (DFW, 2014 & 2016).
- Navigation equipment: in 2004, fleet census (Majdalani, 2005) indicated that eight vessels had GPS and 44 fishers had cellular phones. In addition, 62 vessels were equipped with sonars.
- Navigation license: no vessel owner in Sour had a valid seaworthiness certificate from the Ministry of Public Works and Transport in 2015 (DFW, 2016).
- Net winches: data of 2004 census indicated that 52 vessels were equipped with winches (Majdalani, 2005).
- Vessel ownership: although all owners were recorded as Lebanese, it is thought that Palestinians do own and operate fishing vessels through Lebanese wives and friends. The average age of owner/skipper was 52 years in 2004 with only eight fishers who were younger than 25 years of age (Majdalani, 2005).
- Crew: in 2004, 786 was declared as maximum number of crew aboard fishing vessels in Sour, while the minimum number was 364 and the average number was 576 fishers. Declared foreign fishers were predominantly Palestinians with a few Egyptians and Syrians (Majdalani, 2005).
- Fishermen organizations: in 2004, only eight fishers declared membership in Naqoura Fishermen Coop and seven in Sour Fishermen Coop. However, 209 fishing vessels owners/skippers declared their belonging to South Lebanon Fishermen Syndicate (Majdalani, 2005).
- Fishing zones: In 2004, 99 fishers operated within 3 miles, while 108 operated within 6 nautical miles from their home ports. Nearly 159 vessels targeted Demersal inshore species, mainly of hard sub-stratum (e.g., sea-bream), 56 vessels targeted Demersal offshore species, mainly of soft sub-stratum (e.g., codfish), 12 targeted large pelagic (e.g. tunas, amberjacks), and 7 targeted small gregarious pelagic (e.g., anchovies, sardines, mackerels). The monthly average number of sorties was 19 times (Majdalani, 2005).
- Fish storage facilities: no vessel was equipped with any fish preservation facilities.
- Safety on board: only 25 vessels were equipped with life vests and only one vessel had aboard lifeboat, flares and fire extinguisher.
- Licensed fishing gears in 2015 (DFW, 2016):
 - Drifting longlines (Jirjarah): 14 (the number observed by Sacchi and Dimech in 2011 was only 2-3)
 - Trammel nets: 59
 - Longlines “Sharak”: 42
 - Gillnets: 21
 - Surrounding/purse seiner/lampara: 2

- Fish landings: no specific catch assessment was carried out for Sour. In addition, fishers were not cooperative with MOA efforts to collect landing data, particularly the fishers using lampara/purse seiner nets. Nevertheless, some studies in 2005/2006 (Carpentieri and Colloca, 2005; Lelli et al, 2007) attempted to investigate the fisheries sector of Tyre and the commercial landing. Figure shows that trammel net is the predominant gear, followed by small mesh size gillnets.

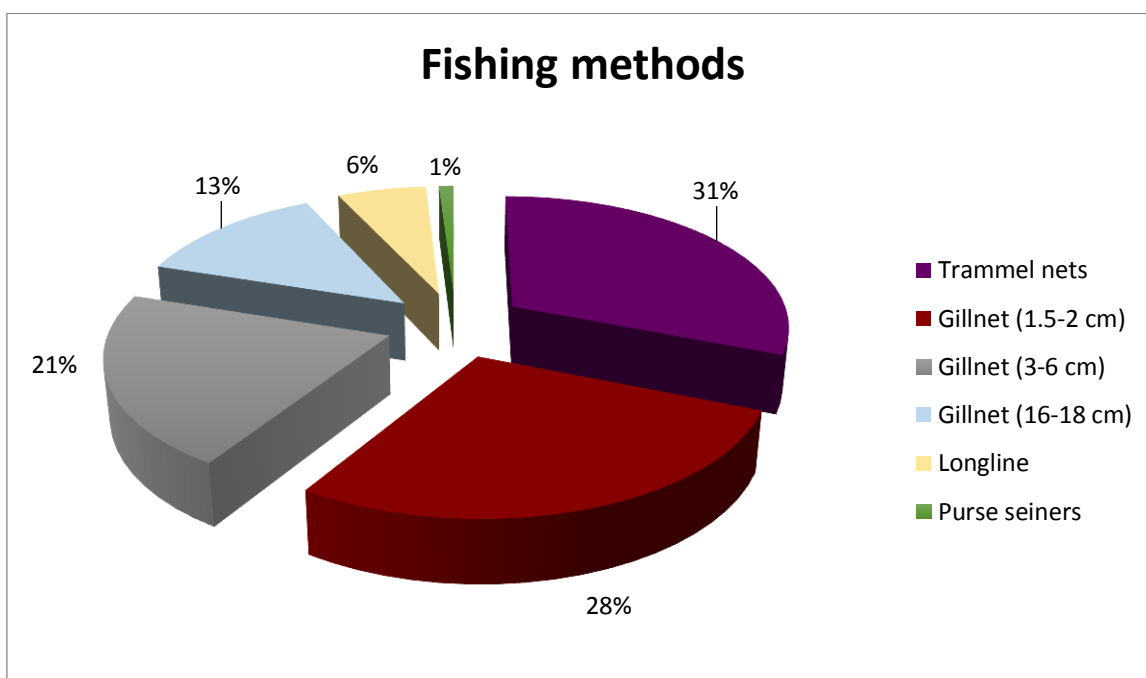


Figure 7: Fishing methods observed in Tyre port

Lelli et al. (2007) identified the fish species and the gear used to catch them as follows:

Table 8: Characteristic of the fishing métiers in Tyre with respective: gear, local name of gear, fishing period, mostly caught species.

GEAR	LOCAL NAME	PERIOD (MONTHS)	MAIN SPECIES
TRAMMEL NETS	Mbattàn	I – XII	<i>Mullus barbatus</i> , <i>Mullus surmuletus</i> , <i>Pagellus erythrinus</i> , <i>Pagellus acarne</i>
TRAMMEL NETS	Mbattàn	I – XII	<i>Penaeus japonicus</i> , <i>Portunus pelagicus</i>
MONOFILAMENT GILLNETS (9 – 22 mm mesh size)	Mbattàn	I – XII	<i>Boops boops</i> , <i>Spicara smaris</i> , <i>Mullus barbatus</i> , <i>Mullus surmuletus</i> , <i>Pagellus erythrinus</i> , <i>Etrumeus teres</i>
MONO/MULTIFILAMENT GILLNETS (24 – 60 mm mesh size)	Mbattàn	I – XII	<i>Diplodus</i> spp., <i>Siganus luridus</i> , <i>Siganus rivulatus</i> , <i>Adioryx ruber</i>
MONOFILAMENT GILLNETS (24 – 60 mm mesh size)	Mbattàn	II – IV	<i>Merluccius merluccius</i>

MULTIFILAMENT GILLNETS (24 – 60 mm mesh size)	Addi spheme	IX – X	<i>Sphyraena sphyraena</i> <i>Sphyraena chrysotaenia</i>
MULTIFILAMENT GILLNETS (24 – 60 mm mesh size)	Addi balamida	XI – I; V – VI	<i>Euthynnus alletteratus</i> , <i>Pseudocaranx dentex</i>
MULTIFILAMENT GILLNETS (160 – 180 mm mesh size)	Addi ghazel	X – VII	<i>Scomberomorus commerson</i> , <i>Euthynnus alletteratus</i> , <i>Dentex Ddentex</i> , <i>Pagrus caeruleostictus</i> , <i>Epinephelus spp.</i>
PURSE SEINES	Addi sardine	I – XII	<i>Atherinidae</i> , <i>Sardinella maderensis</i>
TRAPS	Kfas	VI – VII	<i>Siganus luridus</i> , <i>S. rivulatus</i>
FLOATING LONGLINE	Jarjaara	V – VI; X – XI	<i>Epinephelus spp.</i> , <i>Euthynnus alletteratus</i>
BOTTOM LONGLINE	Sharak	II – IV	<i>Merluccius merluccius</i> , <i>Scorpaena elongata</i>
BOTTOM LONGLINE	Sharak	I - XII	<i>Diplodus vulgaris</i> , <i>D. sargus sargus</i> , <i>Pagrus pagrus</i> , <i>P. caeruleostictus</i>
SPEAR GUN	Fared Sayd	I - XII	<i>Epinephelus spp.</i> , <i>Diplodus vulgaris</i> , <i>D. sargus sargus</i> , <i>Octopus vulgaris</i>

Furthermore, Table 9 shows the mean daily landing by vessel and the mean catch per unit of effort for the most common fishing métiers in use in the port of Tyre.

Table 9: Landings (kg/boat) of the main fishing métiers in Tyre

Fishing gear	Target species	Kg/boat	
		min	max
Trammel nets	<i>Mullus spp. – Pagellus spp.</i>	2.00	20.00
Gillnet (9–22 mm mesh size)	<i>Spicara smaris – Boops boops</i>	5.00	13.00
Gillnet (24–60 mm mesh size)	<i>Diplodus spp. – Siganus spp.</i>	3.50	25.00
Gillnet (160–180 mm mesh size)	<i>Scomberomorus commerson – Pagrus spp.</i>	4.00	12.00
Bottom longlines	<i>Diplodus spp. – Pagrus spp.</i>	1.50	11.00

- Socioeconomic context of the fisheries sector in Sour

In 2013, MOA conducted a socioeconomic survey for the fisheries sector in Lebanon (Pinello & Dimech, 2013). Forty fishers from Tyre region were interviewed. The results were as follows:

- LOA: 7.65 m
- Main gears:
 - Hand lines and trolling lines: 10%
 - Longlines: 20%
 - Pots/traps: 5%
 - Trammel nets: 45%
 - Purse seiners: 18%
 - Set gillnets: 2%
- Fleet segment:
 - Minor gear with engine 6-12 m: 62.5%
 - Minor gear with engine <6 m: 15%
 - Purse seiners 6-12 m: 22.5%
- Average age of vessel owner/skipper: 46 years (with only one skipper less than 25 years old).
- Ownership: 28% of the vessels were owned in partnership. Moreover, 90% of owners are involved in fishing activities.
- Source of income: 90% of fishers indicated that fishing is their main source of income.
- Fishing days: they spend around 200 days per year fishing at sea and they work a minimum of 7 hours daily.
- Crew per vessel: there were 1.5 people engaged in fishing activities per vessel. However, there were 2.25 individuals working on the vessel.
- Sale of fish: 95% sell at the auction with the rest sell at the wholesaler or fishmonger. All declared consuming personally or with family a certain percentage of their catch.
- Fuel consumption: 90% of vessels are operated by diesel engines, while the rest are operated by gasoline engines. Average annual fuel costs were US\$3,400 which varied by fleet segment:
 - Minor gear with engine 6-12 m: US\$3,400/vessel/year
 - Minor gear with engine <6 m: US\$1,400/vessel/year
 - Purse seines 6-12 m: US\$4,800/vessel/year
- Income of fishers: vessel owners declared an average of US\$22.3 to be paid daily to their crews. This varied by fleet segment (US\$21 for 6-12 m LOA, US\$15 for <6 m LOA and US\$32 for purse seiners).
- Other costs: repair/maintenance and bait. These were estimated at US\$837/vessel/year. Fish sale commission ranged between 5-8%. Another US\$900 were spent on the yearly average by vessel for the purchase of fishing gear.
- Monthly income: an average of US\$4,211 was reported by fishers of Sour. This varied according to the fleet segment, where the 6-12 m LOA segment generated US\$2,939/vessel, the <6 m LOA segment generated US\$2,078/vessel and the purse seiners generated a monthly income of US\$9,170.

- Landings: an average of 8.6 tons grossing US\$27,700 were reported by fishers to be landed annually per vessel (2.7 tons grossing \$20,635 for 6-12 m LOA segment, 3.2 tons grossing US\$12,200 for vessels <6 m LOA and 28.8 tons grossing US\$12,963 for the purse seiners).

Fisheries governance

a- Definition

Like so many hot buzzwords, governance has come to mean different things to different people. What is the real meaning of the term, and what should leaders be doing about governance?

Lawrence Juda in 1999 defined governance as “the formal and informal arrangements, institutions, and mores which determine how resources or an environment are utilized; how problems and opportunities are evaluated and analyzed; what behavior is deemed acceptable or forbidden; and what rules and sanctions are applied to affect the pattern of resource and environmental use”. He further added that “the concept of governance is not equivalent to government, but rather incorporates other mechanisms and institutions that serve to alter and influence human behavior in particular directions. The increasingly significant role of nongovernmental organizations in monitoring, evaluating, publicizing, and influencing coastal and ocean management efforts, both within countries and internationally, must be recognized. Likewise, efforts to promote fisheries co-management, in which the fishermen themselves have responsibility for resource management, must be acknowledged.

Kooiman et al. (2005) introduced the concept of Interactive Governance, in their “Fish for Life - Interactive Governance for Fisheries”, that had a more holistic dimension;

Governance is the whole of public as well as private interactions taken to solve societal problems and create societal opportunities. It includes the formulation and application of principles guiding those interactions and care for institutions that enable them.

FAO Term Portal (2017) does not give a single definition for Fisheries Governance, but rather lists many definitions including the above-mentioned definitions by Lawrence Juda (1999) and Kooiman et al. (2005).

The General Fisheries Commission for the Mediterranean (GFCM) online glossary adopts the definition by Garcia (2009), i.e. “a systemic concept relating to the exercise of economic, political and administrative authority”. It encompasses:

- (i) the guiding principles and goals of the sector, both conceptual and operational;
- (ii) the ways and means of organization and coordination of the action;
- (iii) the infrastructure of socio-political, economic and legal instruments;
- (iv) the nature and modus operandi of the processes; and
- (v) the policies, plans and measures.

Nevertheless, FAO (2017) states that “modern fishery governance is a systemic concept relating to the exercise of economic, political and administrative authority. It is characterized by:

- guiding principles and goals, both conceptual and operational;

- the ways and means of organization and coordination;
- the infrastructure of socio-political, economic and legal institutions and instruments;
- the nature and modus operandi of the processes;
- the actors and their roles;
- the policies, plans and measures that are produced; as well as
- the outcomes of the exercise.

Fishery governance establishes the overriding principles and objectives of the sector. It develops the policy and regulatory frameworks. It connects government with civil society, harmonizing individual, sectorial and societal perspectives and maintaining social order and productive socio-ecological systems. It legitimates and balances stakeholders' interaction, enforces decisions and regulations and maintains coherence across jurisdictional, space and time scales. Finally, it conditions the allocation of power, resources and benefits and maintains the governance system capacity to learn and change.

Fishery governance has international, national and local dimensions. It includes legally binding rules, such as national policies and legislation or international treaties as well as customary social arrangements. It is multiscale, covering long-term, strategic, planning as well as short-term operational management and local fisheries but also whole ecosystems. It has public, private, and hybrid components that interact in ensuring administration and regulation of the sector.

Furthermore, FAO (FAO, 2017) indicated that more environmentally conscious, precautionary and participative forms of fishery governance are emerging from the UNCED Conference (United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3-14 June 1992: (informal name: The Earth Summit)) process in which the keywords are: commitment, legitimacy, credibility, transparency, performance assessment, oversight, duty of care, equity, science and other knowledge, traditional values, ethics, systemic, multiscale, integration, coordination, adaptive, affordable and context-sensitive.

b- Principles of sound governance

The Institute on Governance (2017) stated that defining them is difficult and often controversial. They suggest five key principles of sound governance for Protected Areas, based on a United Nations list of the characteristics of good governance:

The Five Principles	The UN Principles on which they are based
1. Legitimacy and Voice 2. Accountability	<ul style="list-style-type: none"> • Participation • Consensus orientation • Accountability to the public and to institution stakeholders • Transparency
3. Performance 4. Fairness	<ul style="list-style-type: none"> • Responsiveness of institutions and processes to stakeholders • Effectiveness and efficiency • Equity • Rule of Law

5. Direction	<ul style="list-style-type: none"> • Strategic vision, including human development, and historical, cultural and social complexities
--------------	---

c- Institutional frameworks for fisheries governance

FAO (2017) summarized the institutional framework for fishery governance as consisting of the sets of principles, rules, conditions, agreements, processes, mechanisms and organizations used for the development and management of fisheries. Its functioning and outcome are influenced by the set of ideas, values, beliefs and assumptions under which the people concerned operate. Since the 1950s, the institutional framework for fisheries has significantly changed, benefiting from a considerable evolution of mentalities and expectations and accumulation of experience. FAO further classified the institutional framework to be at several levels:

- **At international level:** the sets of rules are treaties, both multilateral and bilateral, and other non-binding instruments used by states. Central to these are the 1982 United Nations Convention on the Law of the Sea (UNCLOS), the 1995 United Nations Fish Stocks Agreement and the 1995 FAO Code of Conduct for Responsible Fisheries. In addition, there are a large number of bilateral agreements and regional multilateral agreements that form part of the international set of rules governing fisheries. A range of other agreements not directly relating to fisheries, such as the 1992 Convention on Biological Diversity, have an important bearing on the governance of fisheries. For the national governance of fisheries, these sets of rules may take a number of forms, such as national legislation, local regulations or long-standing customary arrangements.

Numerous organizations have been established to implement these rules. At global level, the UN General Assembly (UNGA) and UN Informal Consultative Process on the Law of the Sea (ICP) address global fisheries issues among other responsibilities and the International Tribunal of the Law of the Sea (ITLOS) is competent for resolving conflict between States. The Food and Agriculture Organization (FAO) is the UN specialized Agency with a global mandate for fisheries policy through its Committee on Fisheries (COFI).

- **At regional level,** a number of regional fishery bodies operate with mandates ranging from data collection and assessment to management. This includes the General Fisheries Commission for the Mediterranean (GFCM).
- **Non-Governmental Organizations (NGOs)** have developed actively at both national and international level.
- **At national level,** specialized ministries for fisheries have been established, sometimes under ministries for agriculture or the environment. Fishers cooperatives, associations, lobbies, etc. have also developed contributing to a greater involvement of civil society in fishery governance.

d- Small-scale fisheries and their governance

Jentoft & Chuenpagdee (2015) in their “Interactive Governance for Small-Scale Fisheries Global Reflections” wrote:

Around the world, small-scale fisheries are diverse in terms of pre-harvest, harvest and post-harvest conditions, activities and technology. They also occur in a wide range of aquatic environments, from river, lake and lagoon to estuarine, inshore and open sea. Small-scale fisheries are closely connected to communities, with kinship and other unique relationship networks, providing them with the sources of resilience and safety nets (Johnson 2006).

It is therefore difficult and inappropriate to consider small-scale fisheries as a distinct sector in governance efforts (Sunde, 2014). In fact, small-scale fisheries are not isolated from other activities, some of which may pose a threat to them, while some are complementary and synergistic. In addition, fisheries governance, whether traditional or modern, formal or informal, does not exist in a vacuum but is often part of a larger governing system that includes other societal sectors and resources. This connectivity is important to recognize, even if it adds challenges to fisheries governance, particularly because of the embeddedness of small-scale fisheries in communities and sectors where solutions and opportunities to address crises and concerns may be found (McCay and Jentoft, 1998).

While small-scale fishers may exert pressure on fisheries resources by their sheer number and by their fishing practices, compared to industrial fisheries, their environmental impact, in terms of by-catch, discards, and overall effect on the local ecosystem, is far less (Kolding et al. 2014). This is especially the case when considering the limit of their range, the scale of their operation, and the subsistence nature of their harvest. Importantly, small-scale fishing people are often very active in stewardship initiatives and conservation efforts to sustain their immediate surroundings (Chuenpagdee and Juntarashote, 2011). As shown by many examples from around the world, when small-scale fishing people are involved in the design and operation of MPAs, these initiatives have a higher chance of succeeding because governability obstacles can be dealt with in a way that small-scale fisheries stakeholders can be satisfied with (Chuenpagdee et al., 2013; Caveen et al., 2015). Unfortunately, many of these conservation efforts, as well as other zoning initiatives, do not appreciate the presence and contribution of small-scale fishing people, thus undermining the sustainability of both the ecological and the social system-to-be-governed.

Globally, fisheries are commonly governed by the hierarchical governing mode. There has been a growing appreciation in recent years of the need to re-embed the responsibility and function of fisheries governance to local and regional organizations as a tool for enhancing governability. The SSF Guidelines express support for this transition. Moving from hierarchical to co-governance, and in some instances, self-governance, may therefore be something to consider from a governability enhancement perspective. It should be noted, however, that in some contexts, for example in developed countries, small-scale fisheries stakeholders already have representation in fisheries governance. The process of broadening the participation of stakeholders means that new and often more powerful groups are included in decision-making processes at the expense of

small-scale fisheries actors, who increasingly feel overwhelmed and threatened (Jentoft and Knol, 2014; Jentoft and Chuenpagdee, 2015).

The SSF Guidelines include key governance principles for their sustainability, rooted strongly in human rights standards and tenure rights. They cover principles related to human dignity, respect for cultures, non-discrimination practices, equity and equality, also related to gender, meaningful participation, rule of law, transparency, and accountability. In the context of small-scale fisheries governance, protecting and encouraging people's right to express their opinion, to organize, and be involved in the governance processes is essential (Jentoft & Chuenpagdee, 2015b).

Small-scale fisheries (SSF), which involve millions of people around the world, contribute significantly to food security, livelihoods and employment. They also represent cultural heritage and identity, and help sustain coastal communities whose existence is dependent on them. Still, small-scale fishers often find themselves in a situation of marginalization, and in many instances, poverty. Rarely do they have a voice in forums where their fate is decided. It is for this reason that, in June 2014, the FAO member states endorsed the "Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication" (SSF Guidelines) (FAO, 2015). The guidelines speak primarily to national governments, who are urged to take greater responsibility for the livelihoods and sustainable development of small-scale fisheries through targeted policy initiatives, followed by legal and organizational reform and economic support.

However, small-scale fisheries do not always lend themselves easily to government intervention. They are simply too diverse, complex and dynamic to allow one-dimensional governance solutions. Small-scale fishers value their freedoms and are often suspicious of ambitions articulated on their behalf. In some instances, the relationship between small-scale fishing communities (e.g. the people who fish, process and bring the produce to the market) and government is even characterized by hostility. Small-scale fishing communities do not always welcome government interference, especially when government is not perceived to be on their side. Development of small-scale fishing activities often takes place independently from government. In many instances, government has actually made its entrance into the life of small-scale fishing people fairly recently. It is also for this reason that policy makers ignore them. The implementation of the above-mentioned guidelines is therefore likely to be less than straightforward (Jentoft, 2014).

It is well known that the capacity to buttress and enforce policies varies a lot from country to country, including within small-scale fisheries governance. In some instances, it is relevant to talk about "soft" or "failed" states (Thorpe et al., 2009), where poor or ineffective governance is widespread and does not only affect small-scale fisheries but society as a whole. In other instances, the state apparatus not only works well, but also enjoys considerable legitimacy among small-scale fishers.

Small-scale fisheries are often upheld by customary organizations that predate current nation-state formations and which continue to be operative, often side by side with government regulations. Customary institutions can be highly

formalized, but in many instances, they are informal and tacit. They operate in a situation of legal pluralism, where several normative orders are active at the same time, which may create governance confusion but can also be a source of institutional innovation (Jentoft and Bavinck, 2014). One may expect to find situations where customary institutions are filling a void in the chain of governance, thus increasing governability (Sunde, 2014). One may also find that legal pluralism restricts governability, such as when formal and informal rules and regulations are incompatible. Governance decisions must therefore be informed by whatever pluralism that exists in particular situations (Jentoft, 2014). If not, governance risks misfiring, failing or damaging small-scale fisheries and communities. Evaluation must be part of a broader governability assessment that should occur prior to, or in concurrence, with small-scale fisheries policy implementation.

Kolding et al. (2014a) wrote:

From the perspective of central government agencies, SSFs have always proved particularly difficult to manage. This results partly from the large number of people involved, and their spatial distribution over large and often isolated areas, in combination with governments' limited personnel and financial constraints.

(Mahon, 1997; Misund et al., 2002).

Government agencies also have difficulties in choosing the right management instruments. Output controls (e.g. TACs) are difficult to implement due to lack of regular assessments, the many species (in tropical areas), and the many dispersed landing sites. Input controls (effort) are in principle easier, but have barely been introduced in developing countries, perhaps for political reasons. One exception is the nearly universal choice of gear or mesh-size regulations, which is largely met with non-compliance (see 'Misperceptions in science-based governance' below).

The recent co-management movement, in fisheries and in conservation has endeavored to harness and enhance the vitality and the conservation-ethos of traditional small-scale fishers and their self-governance systems, and to combine them with governmental regulation. Such attempts have been based on the assumption that governments and communities are truly interested in joint management as, after all, 'it takes two to tango' (Pomeroy and Berkes, 1997). Nevertheless, the establishment of effective co-management systems has proven to be a more arduous process than anticipated, with substantial risks of breakdown and leakage. Co-management in SSFs has a mixed record in many respects (Béné et al., 2009), and in particular with regard to conservation (Berkes, 2006; Pomeroy et al., 2010; Evans et al. 2011). In some places, the lack of success in creating well-functioning co-management institutions has resulted in renewed call for top-down government enforcement, such as for example in Lake Victoria (Kolding et al., 2014b). In many cases, co-management arrangements are top-down, created by governments with non-negotiable objectives (Nielsen et al., 2004).

e- Fisheries governing modes

Kooiman et al. (2005) stated that there are three ideal types: hierarchical governance, self-governance, and co-governance. They added that all societies demonstrate, and require, mixes of these three modes or styles:

- **Hierarchical governance:** the most classical of the governance modes, characteristic for the interactions between a state and its citizens. It is a top-down style of intervention, which expresses itself in policies and in law. Steering and control are key concepts in this approach. Although the metaphor 'steering the ship of state' has now become old-fashioned, the act of steering societal dynamics is still commonplace. The need for control and steering is not in doubt; its practice is more intricate than often imagined. As modern society is diverse, complex, and dynamic, the controlling or steering authority requires complementary abilities. In addition to top-down governance, there are many other arrangements providing for checks and balances in modern societies. In recent years, our perceptions of hierarchical governance have become redefined. The commanding state has been transformed into a regulatory one, the procuring state activities into enabling ones, and benevolent into activating roles. The state nonetheless remains the central governing unit in modern society.

Jentoft & Chuenpagdee (2015) in their "Interactive Governance for Small-Scale Fisheries Global Reflections" - Chapter 2 Assessing governability of small-scale fisheries wrote:

This is perhaps the most common form of fisheries governance. Here, it is important to note that hierarchical governance is not tantamount to state governance by the national government, but a mode that can be found also within local government, even within communities, corporations and cooperatives. It is in other words about the way governance occurs rather than about who is exercising it.

Moreover, hierarchical governance is not necessarily illegitimate, as when it is exercised on the basis of a mandate arrived through a democratic process. An important governability research issue is analyzing when the use of state power is legitimate in fisheries governance and what power relationships are conducive to governability. Democracy and participatory processes are not cost-free, as it may be cumbersome, time-consuming and ineffective (Mikalsen and Jentoft, 2003). The SSF Guidelines have national governments as the most important addressee, and thus clearly recognize the responsibilities that state governments have vis-à-vis small-scale fisheries. The guidelines do not differentiate between state agencies and levels. It is clear that this would be needed when the guidelines are implemented, given the holistic agenda extending beyond the responsibility of a typical fisheries ministry or department. However, the guidelines do not envisage an omnipotent state that governs fisheries only through the hierarchical approach. Similarly, state institutions may in themselves deviate from the ideal Weber's bureaucratic model (1978), assuming more of an organic feature in order to be responsive to shifting circumstances and demands, thus aiming to enhance governability.

- **Self-governance:** in modern society, it refers to the situation in which actors take care of themselves, outside the purview of government. This is a ubiquitous phenomenon, quite distinct from government intention or policy. Liberal governments will highlight societal self-governing capacities, and socialist ones may downplay them. Governments may choose to deregulate or privatize, withdrawing from the public sector or incorporating self-regulatory capacities in their governance frameworks. We emphasize, however, that self-governance is not a government-created capacity, but comes about of its own accord. In fact, without sustaining a capacity for self-governance, societal governance is an impossible task. The collective action school has made the most systematic analysis of self-regulation with regard to the exploitation of common-pool natural resources, such as capture fisheries.

Jentoft & Chuenpagdee (2015) further elaborated that under certain conditions, particularly at lower scales, small-scale fisheries systems have the ability to govern themselves without (much) external interference or support. There is a vast literature documenting how small-scale fisheries governance occurs at the level of the household and the community, often through informal instruments but not always so. For instance, Acheson's analysis of the functioning of the lobster fishery of Maine, US, is now a classical example of a largely informal decentralized governance system (Acheson, 2004). Small-scale fisheries are often governed through institutions and by mechanisms that are informal. The answer to their governability problems is not necessarily formalization, although that may also help in certain situations. For instance, bringing informal use-practices under legal control may be helpful, like when tenure rights are secured by law. Lack of secure communal property rights might bring about encroachment from the outside, which may lead not only to detrimental outcomes for small-scale fisheries but also to a tragedy of the commons. This would be a clear sign of a governance deficiency, either as cause or effect. The latter is a scenario where government imposes regulatory regimes that change customary law and situates control outside small-scale fisheries, which would be an example of the state "colonizing the life-world" of local communities (Habermas, 1984). Government interference is sometimes also described as a dis-embedding process (Granovetter, 1985; Hanna and Jentoft, 1986), as when governance is undertaken by the state bureaucracy, at the expense of community management.

Informal governance in small-scale fisheries may be a problem or an opportunity.

It is therefore essential to explore the capacity and quality of the self-governing mode in particular situations, as contextual factors are likely to influence governance outcomes. In interactive governance terms, the issue is how diversity, complexity, dynamics or scale creates adequate conditions for self-governance. A particularly important research question is how government interference in self-governing systems influences governability,

and how conflicting norms and principles (legal pluralism) are understood and addressed.

- **Co-governance.** The essential element of this governance mode is that societal parties join hands with a common purpose in mind, and stake their identity and autonomy in the process. Much attention has been devoted to co-governance and to the opportunities it opens. In fisheries, the form of co-governance called co-management is particularly influential. We discuss so-called 'fisheries co-management' in this volume as an expression of co-governance. Co-governance is much broader than the other governance modes and implies the use of organized forms of interaction for governing purposes. A key assumption is that no one actor is in control; instead, interactions are of a horizontal kind. Governance theory contains numerous manifestations of co-governance, including communicative governance, public-private partnerships, networks, regimes and co-management. Kooiman et al. (2005) believe that co-governance, in its varying forms, is well equipped to deal with diverse, complex, and dynamic situations. No society, however, operates solely along the lines of co-governance, or, for that matter, of self- or hierarchical governance. Instead, mixes of various modes inevitably prevail. Their design is of special concern.

Jentoft & Chuenpagdee (2015) mentioned that the government is not seen as a threat and a troublemaker, but a potentially constructive partner in interactive governance. Governability is enhanced by drawing on the capacities of both small-scale fishers and the government, while compensating for the inherent disabilities of both. In fisheries, co-governance is synonymous with co-management, where management is perceived broadly to also involve institutional matters. Whereas co-governance is meant to enhance the governability of issues pertaining to scale and complexity, it is also seen to be a qualitative governability measure, one that enables stakeholder participation, power-sharing and democracy. However, co-governance may in itself contribute to complexity in fisheries by increasing the number of possible relationships, interactions and transaction costs. The broader the participation, the more cumbersome is the process. Enhanced governability is at best a possibility and not a given.

Kooiman (2003) argues that the governing system must be isomorph to the system-to-be-governed; i.e. if small-scale fisheries as a system-to-be-governed are diverse, complex, dynamic and multi-scalar, so must the governing system. Still, one may imagine that the latter cannot be a goal in itself, that there are limits to how complex and dynamic a governing system can be, if this leads to reduced transparency and predictability. Institutional stability and robustness usually go together. In practice, fisheries governance often involves a mixture of elements of the three modes, forming hybrid institutions and sharing of various governance functions. Small-scale fisheries research should therefore examine from a governability perspective the relationships and dynamics that occur between different governing modes in different contexts and how they perform and develop over time.

For GFCM (2016), there is consensus in the region that participatory management and multi-level governance approaches are necessary to strengthen small-scale fisheries in the Mediterranean and the Black Sea. This view has been motivated by different factors, including the current state of overexploitation of a significant percentage of marine living resources, the lack of government resources to fully implement and enforce management measures, especially for coastal fisheries, and recognition that small-scale fisheries are in many cases excluded from management processes, despite their substantial importance in the region.

In this context, decentralization and co-management seem to represent viable governance alternatives for small-scale fisheries in the GFCM area of application. Co-management covers a wide range of collaborative decision-making mechanisms between government and communities or user groups, and enables the sharing of responsibility and authority at different levels of fisheries management. It is a dynamic partnership based on the capacities of both local fishers and communities and on the state's ability to provide enabling policies and legislation, enforcement and assistance with the participation of civil society and scientists.

Co-management has proved to be crucial to ensuring the proactive participation of fishers in setting-up fisheries management plans that account for local institutional arrangements and knowledge. Involving fishers in data collection, the identification of management measures, monitoring and control, helps to raise their awareness about the environment, enhance their sense of ownership and stewardship over resources and increase commitment and compliance to rules and regulations.

Some experiences have shown that the co-management approach has already been adopted successfully in the Mediterranean and the Black Sea. On the Mediterranean coast of France, professional organizations of fishers, known as *Prud'homies*, have been present since medieval times and currently comprise large numbers of small-scale fishers, who together work on more than 1,500 fishing vessels. Fishers' guilds in Spain, named *cofradías*, also have a long history of fisheries management. In general, the *cofradía* is the institutional system for 83 percent of fisheries employment in Spain, bringing many benefits for members. Today, 229 *cofradías* are spread out along the entire Spanish coastline and throughout the islands. Other examples in the Mediterranean where co-management, or at least some elements of it, are present include local cooperatives in Turkey, the management of coastal clam fisheries in Italy, the Grenelle de la Mer in France, and the co-management committee of the Catalan sand eel fishery.

f- Governance of tenure

Tenure systems determine who can use which resources, for how long, and under what conditions. The systems may be based on written policies and laws, as well as on unwritten customs and practices. (FAO, 2012)

FAO (2012) Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security stresses:

- Governance of tenure in fisheries (FAO, 2011)

- o About tenure

Tenure in fisheries – as in other natural resource sectors – refers to the manner in which the relationships between people are defined and negotiated in the context of the utilization of fishery and related resources, i.e. tenure defines who is a user and, therefore, who has a legitimate right to a resource and who does not. Governance of tenure then deals with how tenure rights are allocated, changed (legalized, transferred, etc.) and administered (FAO, 2013).

While formal tenure rights are generally still a developing concept in fisheries, there is a long history of customary and traditional tenure systems in fishing communities (Cordell, 1989). These have tended to be in the form of rights (to fish) in certain areas – i.e. spatial access or use rights (see section What are the different types of formal tenure rights in fisheries? below) – and have often been found in conjunction with land tenure. In many places, for example in small island States in Oceania, natural resources and the space they occupy have traditionally not been divided into two different components of land and water (Aswani, 2005). Instead, nature – including humans and society – has been seen holistically, with communities having a multifunctional resource space as the basis for their livelihoods (Ruddle, 1988). Hence, fisheries tenure cannot be viewed in isolation but needs to be considered in connection with a broader land and livelihoods context (FAO, 2011).

However, the development of formal tenure arrangements in fisheries has tended to focus on access to fisheries and use of fishery resources. In this context, the terminology of “rights” is perhaps more commonly used than “tenure”. Still, tenure is a useful term because it indicates the broader system of rights – formal and informal – and includes social and societal notions of rights that individuals, groups of people or communities may have to a fishery resource. The term tenure rights covers the concepts of use and management rights but it is different from ownership and it is broader than fisheries management. Accordingly, tenure also includes traditional and customary rights that are not formally legalized.

- Context matters

The overall size of the resource system matters and, therefore, boundaries of resource system and resource sectors are useful. Distinctive location and context specificities put resources in a unique position. In addition to spatial considerations, tenure must be understood in its particular historical context. User units in whose favor tenure will be allocated need to be defined.

- Who has rights to fishery resources, and what are the related responsibilities?

The VGGT points out that “States have the power to allocate tenure rights in various forms, from limited use to full ownership. Policies should recognize the range of tenure rights and right holders.” (FAO, 2012)

- A variety of measures to control fishing (e.g. licensing, catch quotas, gear regulations) can be used, and governments can also delegate rights and responsibilities to individuals or communities. Fishery resources have the character of common pool resources, i.e. “resources in which (i) exclusion of beneficiaries through physical and institutional means is especially costly, and (ii) exploitation by one user reduces resource availability for others” (Ostrom et al., 1999). The need for fisheries management is based on this concept of fish stocks as common pool resources and that “individual fishers are unable to control the activities of other fishers in exploiting this common pool. Individuals’ attempts to moderate their own use of the resource will only result in benefits flowing to other users and, as a result, there is every reason to overuse, rather than conserve, the resource” (FAO, 2005–2013). Fisheries that do not have regulations with regard to access are commonly referred to as “open access” fisheries, i.e. allowing anyone who wishes to fish to do so, and are hence likely to be subject to economic inefficiency due to overcapitalization as well as overexploitation (FAO, 2013).
- Key factors to consider in tenure systems in fisheries
 - Responsibilities: Tenure must include both rights and responsibilities.
 - Respect, conflict and cooperation: The existence of traditional mechanisms of conflict resolution in fishing communities is a key factor in conflict management. Governance of tenure may require access rights to be limited to some resource users and to exclude others, often resulting in conflicts. Conflict management mechanisms must be established. Local communities have various abilities, based often on respect and cooperation, to address conflicts that arise among them. These are important for the administration of a tenure system for fisheries.
 - Equity, fairness and development: A specific focus of attention is on equity issues: who holds fishing rights (crucial to community well-being, food security, poverty alleviation) and how does tenure impact on social, economic and human rights? Furthermore, the definition and allocation of rights to fish must include “poverty-reduction criteria as a key component of decisions over equitable allocation of rights”. Also crucial is to relate tenure to the overall objectives of development policy in a broad perspective that includes post-harvest aspects and rights that arise beyond the fisheries ‘silo’.
 - Pre-existing rights: Most inshore and coastal areas are defined by some type of system of tenure and are not really open access. This needs to be factored into management and conservation initiatives.
 - Management rights: Management regimes designed by the communities themselves ensure local ownership of management measures and makes it easier, or even guarantees their implementation.
- Characteristics of tenure types (FAO, 2013): Generally, a set of four attributes can be used to describe the characteristics of the different types of tenure rights in fisheries. These characteristics apply to all types of

tenure rights, including both common and private property rights. The greater is the extent of these attributes, the stronger is the right (Scott, 2000):

- **Security** refers to the ability of the holder of the right to hold onto this right and not to have it challenged or revoked by other individuals, institutions or the government.
 - **Durability** refers to the time span of the entitlement and can range from virtually nothing or one season or year to perpetuity.
 - **Transferability** refers to the ability of the right holder to reassign (transfer or sell) his/her entitlement to others.
 - **Exclusivity** refers to the extent to which the rights holder is allowed to use and manage his/her entitlement – such as a share of a fish stock – without interference from fisheries management regulations (with regard to methods of harvesting, seasons, etc.).
- Types of formal tenure rights in fisheries

There are many different forms of tenure rights in fisheries in the context of rights-based fisheries management. It is a fairly complex arena and there is no globally agreed set of terms. The designations and definitions used vary between countries, locations and organizations. In this document, the term “use right” is utilized by preference when referring to formal rights to fishery resources, i.e. when defining who is involved in a fishery and how. When rights also include management responsibilities, i.e. a right or obligation to be part of fisheries management, the term “management right” is sometimes used.

Fisheries tenure rights would typically be seen as part of a broader fisheries governance and management framework. Some tenure rights arrangements resemble measures applied in conventional fisheries management e.g. access rights to a fishery (licenses) or withdrawal or harvest rights (quotas).

These are similar to fisheries management input (effort) and output controls but are, from a rights-based fisheries management perspective, seen as rights or privileges given to fishers instead of as restrictions and regulations.

There are a number of different area-based management regimes that refer to the fishing location, e.g. territorial use rights in fisheries (TURFs). TURFs assign rights to individuals or groups to fish within a certain location, commonly based on a customary right.

Zoning is a type of area-based management tool approach. Countries sometimes give preferential access to small-scale fishing, in general in inshore waters, e.g. by prohibiting larger vessels to fish close to shore. However, such regimes are sometimes weakly enforced and tend not to resolve the inability to limit access and fishing effort. There may also be competing non-fisheries uses in the inshore area, and increased attention needs to be given to broader spatial planning systems, combining and coordinating plans and activities of different sectors.

Community-based management systems vest management rights in communities or community groups. When communities and governments share management responsibilities, co-management arrangements are referred to. A co-management arrangement can also include other partners, e.g. non-governmental organizations (NGOs), research institutions and traditional leaders. Co-management is by and large considered the recommended best practice for small-scale fisheries management. Co-management arrangements are often combined with a delegation of management responsibilities from the central-level government to local governments in addition to giving management responsibilities also to resource users. In fisheries and with regard to management responsibilities of coastal and inshore waters, several countries have given local governments increased responsibilities (e.g. in the Philippines and in Indonesia) (Pomeroy and Rivera-Guieb, 2006; Pomeroy, 2001).

Table 10: Typology of rights-based management systems – examples found in OECD countries

Type of right	Key features
Territorial use rights in fisheries	Allocation of a certain area of the ocean to a single user, usually a group, which then undertakes fishing by allocating rights to users within the group. Usually of long duration and with a high degree of formal and informal transferability within the group.
Community-based catch quotas	Catch quotas are attributed to a fishing community with decisions on allocation of rights within the community taken on a cooperative basis. They are often used in formalizing traditional access rights in small-scale fisheries. They provide a high degree of exclusivity, divisibility and flexibility.
Vessel catch limits	Restrict the amount of catch that each vessel can land for a given period (week, month or year) or per trip. These instruments are characterized by relatively low or moderate levels for most rights characteristics. They provide limited exclusivity and may not reduce the race for the fish, while providing some degree of flexibility and quality of title.
Individual non-transferable quotas	Provide a right to catch a given quantity of fish from a particular stock, or, more usually, a percentage of a total allowable catch (TAC). Relatively high characteristics of exclusivity and flexibility allow rights holders to use their rights in a least-cost way to secure a given quantity of fish. The race for the fish that exists under a competitive TAC is largely eliminated, but the lack of transferability restricts the efficiency of harvesting.
Individual transferable quotas	Provide a right to catch a given percentage of a TAC, which is then transferable. This instrument rates highly on all criteria. The features of the system allow for appropriate long-term incentives for investment decisions as well as optimizing short-term use of fishing capacities.
Limited non-transferable licenses	These licenses can be attached to a vessel, to the owner, or to both, and have to be limited in number and applied to a specific stock or fishery to be considered as market-like. By restricting access to a stock, this instrument helps to reduce the race for the fish and prevent rent dissipation. However, the lack of transferability and divisibility limits the optimal use of fishing capacity.
Limited transferable licenses	By making limited licenses transferable, fishers are provided with an increased incentive to adjust capacity and effort over the short to long term in response to natural and economic conditions. They are generally given for a very long duration, but are not divisible.

Individual non-transferable effort quotas	Rights are attached to the quantity of effort unit that a fisher can employ for a given period. They tend to be used in fisheries for sedentary species and are characterized by moderate or relatively high levels of exclusivity, duration and quality of title.
Individual transferable effort quotas	Transferability makes short- and long-term adjustment easier and allows for a better use of fishing capacities.

(Sources: Adapted from pp. 13-14, MRAG *et al.*)

○ What are customary and informal tenure rights?

Fisheries tenure rights can be formal and legally recognized – as those described above in the context of rights based fisheries management – or informal and customary (or traditional). Customary tenure rights of a community include the collective rights of community members to the natural commons as well as private rights of community members to specific land parcels or natural resources. Informal tenure rights are tenure rights that lack formal, official protection by the State. They often arise spontaneously, e.g. the emergence of informal tenure rights in areas arising from migrations. These rights can still be legitimate because they are being covered by, for example, international laws and conventions, treaties or other legal instruments although not explicitly included in national tenure legislation. Informal and customary rights generally play an extremely important role, particularly in the small-scale fisheries sector and in developing countries. Moreover, many formal tenure systems are based on rights that were initially customary. In some countries, customary tenure rights have been granted formal legal recognition equivalent to other statutory tenure rights. In other countries, they lack legal recognition. This means there are cases where legitimate customary rights exist but, because these are not formally recognized, rights holders cannot easily defend them in the event of competition from other resource users. Expansion of tourism, port or harbour infrastructure projects and industrial progress have increasingly led to claims by other interest groups and resource users on land in coastal areas traditionally held by fishing communities. Forced eviction of coastal communities for the purposes of such developments is on the rise (Monsalve *et al.*, 2009). There are also examples of formal tenure arrangements that have been set up without respecting already existing customary and traditional rights, and this has then given rise to conflicts and hardship for coastal communities. An example is the post-apartheid legal reform in South Africa, which failed to accommodate the customary rights of traditional fishing communities (FAO, 2013).

g- What is fisheries management?

FAO (2013) stated that fisheries management aims to achieve sustainable utilization of fishery resources, optimizing the benefits for society at the same time as safeguarding biodiversity. The term “conventional fisheries management” tends to be used for fisheries management carried out by a State through centralized command-and-control measures.

This is the system that often replaced local customary and traditional systems as nation States with centralized administrations developed and exclusive economic zones (EEZs) were extended in the 1970s. As these systems have not always been effective, participatory management involving various degrees of decentralization and devolution of state functions and the introduction of right-based management systems have started to be advocated.

The scope of fisheries management has also widened in recent years to take broader ecosystem considerations more explicitly into account. The ecosystem approach to fisheries (EAF) “strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries” (p. 14, FAO, 2003). Its principles are not new but firmly anchored in a number of policy instruments and international agreements on sustainable development. Many governments and organizations are moving towards implementing ecosystem-based approaches to fisheries and natural resource management.

Local survey for governance

A questionnaire (annex III) that was adapted from the one developed by Gilles Hosch (2012) as a “Performance assessment tool for Fisheries Governance in the ESA/IOC region” was used. The questionnaire is “inspired by the tenets of the 1995 FAO Code of Conduct for Responsible Fisheries, which embodies a widely accepted and adopted blueprint for fisheries policy making and governance”.

The monitoring tool is meant to function as a “fisheries governance barometer”, which generates an indicator for the performance of fisheries governance of a country. The indicator is a percentage value, which may fall along a 20% to 100% range.

The tool also generates more detailed sub-indicators for seven thematic domains, which have been selected to embody the most relevant sub-components of fisheries governance.

The seven thematic domains into which the questionnaire is segmented, and key sub-topics addressed in those, are the following:

1. Governance: policy, law, institutions, transparency, rule of law, consultation, conflict management.
2. Research: institution, capacity, sampling, publications, research effectiveness.
3. Fisheries management 1: national fisheries, FMPs, rules, by-catch, overcapacity, sharks.
4. Fisheries management 2: fleets, GFCM membership, seabirds, GFCM rule implementation.
5. MCS: MCS agency, powers of officers, means, budgets and planning, NPOA-IUU, risk analysis, SOPs, results.
6. Post-harvest: framework, utilization, processing.
7. Social & economic: investment, economic analysis, subsidies, trade & trade law, fisher age and CPUE trends, value capture.

In total, the questionnaire consists of 202 questions, distributed as follows across the seven domains:

1. Governance: 46
2. Research: 26
3. Fisheries management 1: 24
4. Fisheries management 2: 26
5. MCS: 41
6. Post-harvest: 8
7. Social & economic: 31

The interviewees were as follows:

		Respondents name	Organization	Title	Interview method
1	Government				
2	Government				
3	Government				
4	Government				

5	Civil Society				
6	Civil Society				
7	Private Sector				
8	Private Sector				
9	Private Sector				
10	Private Sector				
11	Private Sector				
12	Private Sector				
13	Scientific Community				
14	Scientific Community				

Face-to-face interviewing (at respondents' premises) was conducted when feasible; otherwise, the questionnaire was forwarded electronically to some respondents who filled and returned it electronically; telephone interviewing was conducted with at least one of the stakeholders due to technical difficulties.

References

- Abboud Abi Saab M., Fakhri M., Sadek E. and Matar N. (2008), 'An estimate of the environmental status of Lebanese littoral waters using nutrients and chlorophyll as indicators', *Lebanese Science Journal*, Vol. 9, No. 1, 18 p.
- Acheson, J. M. (2004), *Capturing the commons: Devising institutions to manage the Maine lobster industry*, Lebanon: The University Press of New England.
- Aswani, S. (2005), 'Customary sea tenure in Oceania as a case of rights-based fishery management: does it work?' Reviews in *Fish Biology and Fisheries*, Vol. 15, No.3, pp. 285–307.
- Bariche M., Alwan N., EL-Fadel M., (2006), 'Structure and biological characteristics of purse seine landings off the Lebanese coast (Eastern Mediterranean)', *Fisheries Research*, Vol. 82, No. 1-3, pp. 246-252.
- Béné, C., Belal, E., Baba, M. O., Ovie, S., Raji, A., Malasha, I., Njaya, F., Na Andi, M., Russell, A. and Neiland, A. (2009), 'Power struggle, dispute and alliance over local resources: analyzing 'democratic' decentralization of natural resource through the lenses of Africa inland fisheries', *World Development* Vol. 37, 1935–1950.
- Berkes, F. (2006), 'From community-based resource management to complex systems', *Ecology and Society* Vol. 11 No. 45, available at <http://www.ecologyandsociety.org/vol11/iss1/art45/>
- Brême, Ch. (2004), *Analyse situationnelle de la Pêche côtière. Aspects techniques, économiques, sociaux et commerciaux*, Rapport mission au Liban TRANSTEC, CE.
- Bustani, Layal (2012), *Biological Study and Stock Assessment of Boops boops, Diplodus sargus sargus, and Lagocephalus scleratus off the Coast of North Lebanon*, Master Thesis, University of Balamand.
- Carpentieri, P. & F. Colloca (2005), *Preliminary analysis of the fishing sector of Tyre (South Lebanon)*, Caritas-Lebanon & Ricerca e Cooperazione.
- Caveen, A., Polunin, N., Gray, T., & Stead, S. M. (2015), *The controversy over marine protected areas. When science meets politics*, Dordrecht: Springer.
- Chuenpagdee, R., & Juntarashote, K. (2011), 'Learning from the experts: Attaining sufficiency in small-scale fishing communities in Thailand', In S. Jentoft & A. Eide (Eds.), *Poverty mosaics: Realities and prospects in small-scale fisheries*, Dordrecht: Springer.
- Chuenpagdee, R., Pascual-Fernandez, J. J., Szelianszky, E., Alegret, J. L., Fraga, J., & Jentoft, S.

(2013), 'Marine protected areas: Re-thinking their inception', *Marine Policy*, Vol. 39, pp. 234–240.

Colloca, F. & S. Lelli (2012), *Report of the FAO EastMed support to the fishing trials carried out off the South Lebanese Coast*, GCP/INT/041/EC – GRE – ITA/TD-14.

Cordell, J., ed. (1989), *A sea of small boats*, Cambridge, USA, Cultural Survival Inc.

C.E.D.R.E (2002). Pollution marine et altération du littoral libanais: évaluation des risques et protection. CNSM-CNRS Liban, INA P-G France.

DFW Department of Fisheries & Wildlife-Ministry of Agriculture (2014), *Fishing Licenses Data*, Internal report.

DFW Department of Fisheries & Wildlife-Ministry of Agriculture (2016), *Fishing Licenses Data*, Internal report.

Evans, L., Cherrett, N. and Pems, D. (2011), 'Assessing the impact of fisheries co-management interventions in developing countries: A meta-analysis', *Journal of Environmental Management*, Vol. 92 No. 8, pp. 1938-49.

FAO (2005–2013), 'Regulating fishing capacity', in *FAO Fisheries and Aquaculture Department*, available at www.fao.org/fishery/topic/14857/en.

FAO (2011), *Report of the FAO Workshop on Governance of Tenure for Responsible Capture Fisheries*, Rome, 4–6 July 2011, FAO Fisheries and Aquaculture Report No. 983, 34 pp.

FAO (2012), *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security*, available at <http://www.fao.org/docrep/016/i2801e/i2801e.pdf>.

FAO (2013), *Implementing improved tenure governance in fisheries – A technical guide to support the implementation of the voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security. Preliminary version*, September 2013, 71 pp.

FAO (2015), 'First Regional Symposium on Sustainable Small-Scale Fisheries in the Mediterranean and Black Sea, 27–30 November 2013, Saint Julian's, Malta, edited by Abdellah Srouf, Nicola Ferri, Dominique Bourdenet, Davide Fezzardi and Aurora Nastasi' *FAO Fisheries and Aquaculture Proceedings*, No. 39., 519 pp.

FAO (2015), *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication*, available at www.fao.org/3/a-i4356e.pdf.

FAO (2017), *FAO Term Portal*, available at <http://www.fao.org/faoterm/en/?defaultCollId=21>

FAO (2017). *Fisheries and aquaculture governance*, available at <http://www.fao.org/fishery/topic/2014/153543/en>

FAO EastMed (2011), *Report of the 2nd Meeting of the EastMed Co-ordination Committee*, GCP/INT/041/EC – GRE – ITA/TD-07.

FAO EastMed (2016), *A Sub-regional Analysis of the Socio-Economic situation of the Eastern Mediterranean*.

Garcia, S.M. (2009), 'Governance, science and society', in Quentin Grafton, R.; Hilborn, R.; Squires, D.; Tait, M. and Williams, M. (Eds). *Handbook of Marine Fisheries Conservation and Management*. Oxford: Oxford University Press: 87-98.

GFCM - General Fisheries Commission for the Mediterranean (2014), *Strategic Roadmap in support of Fisheries & Aquaculture in Lebanon*.

GFCM-General Fisheries Commission for the Mediterranean (2016), *The State of Mediterranean and Black Sea Fisheries*.

Granovetter, M. (1985), 'Economic action and social structure: The problem of embeddedness', *American Journal of Sociology*, Vol. 91 No. 3, pp. 481–510.

Habermas, J. (1984), *The theory of communicative action*, Boston: Beacon.

Hanna, S., & Jentoft, S. (1986), 'The human use of the environment. An overview of social and economic dimensions', in S. Hanna, C. Folke, & K.-G. Mähler (Eds.), *Rights to nature*, Washington, DC: Island Press.

Hosch, G. (2012), 'Fisheries Governance Performance Assessment tool', *Smart Fish Working Papers* No 022.

Houri A. & SW El Jeblawi (2007), 'Water quality assessment of Lebanese coastal rivers during dry season and pollution load into the Mediterranean Sea', *J Water Health*, 2007 Dec, Vol. 5 No. 4, pp.615-23.

Institute of Governance (2017). *Defining Governance*, available at <http://iog.ca/defining-governance/>.

Jentoft, S. (2014), 'Walking the talk: Implementing the international voluntary guidelines for securing sustainable small-scale fisheries', *Maritime Studies*, Vol. 13 No. 16.

Jentoft, S., & Bavinck, M. (2014), 'Interactive governance for sustainable fisheries: Dealing with legal pluralism. Current Opinion', *Environmental Sustainability*, Vol. 11, pp. 71–77.

Jentoft, S. & R. Chuenpagdee (Eds.) (2015a), *Interactive Governance for Small-Scale Fisheries-Global Reflections*, MARE Publication Series 13. Springer, 782pp.

Jentoft, S., & Chuenpagdee, R. (2015b), 'The 'new' marine governance. Reality or aspiration', In M. Gileck & K. Kern (Eds.), *Governing Europe's marine environment: Europeanization of regional seas or regionalization of EU policies?*, London: Ashgate Publishing.

Jentoft, S., & Knol, M. (2014), 'Marine spatial planning: A view from the North Sea', *Maritime Studies (MAST)*, Vol. 12, No. 13, available at <http://www.maritimestudiesjournal.com/content/12/1/13>

Johnson, D. S. (2006), 'Category, narrative, and value in the governance of small-scale fisheries', *Marine Policy*, Vol. 30 No. 6, pp. 747–756.

Juda, Lawrence (2009), 'Considerations in Developing a Functional Approach to the Governance of Large Marine Ecosystems', *Ocean Development & International Law*, Vol. 30, pp. 89–125.

Kolding, J., C. Béné and M. Bavinck (2014a), 'Chapter 22: Small-scale fisheries: Importance, vulnerability and deficient knowledge', in S. Garcia, J. Rice and A. Charles (eds) 2014, *Governance for Marine Fisheries and Biodiversity Conservation. Interaction and coevolution*, Wiley-Blackwell.

Kolding, J., Medard, M., Mkumbo, O. and van Zwieten, P.A.M. (2014b), 'Status, trends and management of the Lake Victoria Fisheries', in 'Inland Fisheries Evolution and Management: Case Studies from Four Continents' (eds R.L. Welcomme, J. Valbo-Jorgensen and A.S. Halls), *FAO Fisheries and Aquaculture Technical Paper* No. 579.

Kooiman, J. (2003), *Governing and governance*, London: Sage.

Kooiman, J., Bavinck, M., Jentoft, S., & Pullin, R. (Eds.). (2005), *Fish for life. Interactive governance for fisheries*, Amsterdam: Amsterdam University Press.

Lelli S., Carpentieri P., Colloca F., Moubayed S. (2007), 'Commercial landing and fishing métiers within the artisanal fishery of Tyre, Lebanon', Tyre Reports on the Fishing Sector (2005-2007). Published with the contribution of the Italian Ministry of Foreign Affairs - DGCS in the framework of the Project 7461/RC/LBN.

Localiban (2017), *Territorial administration of Lebanon. South Lebanon Governorate*, available at <http://www.localiban.org/rubrique518.html>.

Mahon, R. (1997), 'Does fisheries science serve the needs of managers of small stocks in developing countries?', *Canadian Journal of Fisheries and Aquatic Sciences*, Vol. 54, pp. 2207–2213.

Majdalani, S. (2004), 'The present status of fishery and information system in Lebanon', GCP/INT/918/EC - TCP/INT/2904/TD-4.1. *MedFisis Technical Document*, No. 4.1, 45pp.

Majdalani, S. (2005). *Census of Lebanese Fishing Vessels and Fishing Facilities*, Ministry of Agriculture Lebanon.

Majdalani, Samir (2013), Draft/unpublished *FAO Fishery and aquaculture country profile*.

McCay, B., & Jentoft, S. (1998), 'Market or community failure? Critical perspectives on common property research', *Human Organization*, Vol. 57 No. 1, pp. 21–29.

Mikalsen, K. H., & Jentoft, S. (2003), 'Limits to participation? On the history, structure and reform of fisheries management in Norway', *Marine Policy*, Vol. 27, pp. 397–407.

Misund, O.A., Kolding, J. and Fréon, P. (2002), 'Fish capture devices in industrial and artisanal fisheries and their influence on management', in *Handbook of Fish Biology and Fisheries*, Vol. 2 (eds. P.J.B. Hart and J.D. Reynolds), pp. 13–36, Blackwell Science, London.

MOA Ministry of Agriculture (2010), *General Agriculture Census*, available at www.agriculture.gov.lb/Arabic/DataAndAgriStatistics/OverallAgriStatistics/Pages/default.aspx.

MOA Ministry of Agriculture (2017), *MOA 2015 – 2019 Strategy*. available at http://www.agriculture.gov.lb/ARABIC/ABOUTUS/STRATEGY_2015_2019/Pages/default.aspx.

MOE Ministry of Environment (2017), *Protected Areas in Lebanon-Tyre Coast*, available at <http://www.moe.gov.lb/ProtectedAreas/tyre.htm>.

MOE & UNDP (2010). 'Vulnerability and adaptation of coastal zones' in *Climate risks, vulnerability & adaptation assessment* (final report); prepared by ELARD (Earth Link & Advanced Resources Development), chap. D, p. 33, available at <http://www.moe.gov.lb/climatechange/>.

Monsalve Suárez, S., Marques Osorio, L. & Langford, M. (2009), 'Voluntary guidelines for good governance in land and natural resource tenure: civil society perspectives', *Land Tenure Working Paper 8*, FIAN International and Hakijamii (Economic and Social Rights Centre), Rome, FAO, 85 pp. available at <ftp://ftp.fao.org/docrep/fao/011/ak280e/ak280e00.pdf>.

Nassif, N. (2004), *Pollution chimique de la côte libanaise : essai de modélisation et approche réglementaire*, Thèse de doctorat, INAPG, France.

Nielsen, J.R., Degnbol, P., Viswanathan, K.K., Ahmed, M., Hara, M. and Abdullah, N.M.R. (2004), 'Fisheries co-management-an institutional innovation? Lessons from South East Asia and Southern Africa', *Marine Policy* Vol. 28, pp. 151–160.

Ostrom, E., Burger, J., Field, C.B., Norgaard, R.B. & Policansky, D. (1999), 'Revisiting the commons: local lessons, global challenges', *Science* Vol. 284, pp. 278–282.

PescaMed (2011), *Development of cooperation in the Mediterranean Fishery sector: World of labour, Producers' organizations, consumers' associations and training – Country reports*, Tricase, Lecce, Italy, 443 pp., Imago Pubblicità srl.

Pinello, D., & Dimech M., (2013), 'Socio-Economic Analysis of the Lebanese Fishing Fleet', GCP/INT/041/EC – GRE – ITA/TD-16.

Pomeroy, R.S. (2001), 'Devolution and fisheries co-management', in R. Meinzen-Dick, A. Knox & M. Di Gregorio, eds. *Collective action, property rights and devolution of natural resource management: exchange of knowledge and implications for policy*, pp. 108–145. Feldafing, Germany, DSE/GTZ.

Pomeroy, R. and Berkes, F. (1997), 'Two to tango: the role of government in fisheries co-management', *Marine Policy* Vol. 21, pp. 465–480.

Sacchi, J. & M. Dimech (2011), *Report of the FAO EastMed Assessment of the Fishing Gears in Lebanon*, 53 pp., EastMed Technical Documents TD-09.

Pomeroy, R., Garces, L., Pido, M. and Silvestre, G. (2010), 'Ecosystem-based fisheries management in small-scale tropical marine fisheries: emerging models of governance arrangements in the Philippines', *Marine Policy* Vol. 34, pp. 298–308.

Pomeroy, R.S. & Rivera-Guieb, R. (2006), *Fisheries co-management: a practical handbook*, Rome, CAB International, and Ottawa, International Development Research Centre.

Ruddle, K. (1988), 'Social principles underlying traditional inshore fishery management systems in the Pacific Basin', *Marine Resource Economics*, Vol. 5, pp. 351–363

SAMUDRA (2008), *Statement from the Civil Society Preparatory Workshop to the Global Conference on Small-Scale Fisheries (4SSF)*, Bangkok, Thailand. SAMUDRA Report, No. 51, pp. 7–9.

Scott, A. (2000), 'Introducing property in fishery management', in R. Shotton, ed. *Use of property rights in fisheries management*, Proceedings of the FishRights99 Conference, Fremantle, Western Australia, 11-19 November 1999. Mini-course lectures and core conference presentations, pp. 1–13. FAO Fisheries Technical Paper No. 404/1. Rome, FAO.

Sunde, J. (2014), *Customary governance and expressions of living customary law at Dwesa-Cwebe: Contributions to small-scale fisheries governance in South Africa*, Doctoral thesis, University of Cape Town, Cape Town.

Thorpe, A., Whitmarsh, D., Ndomahina, E., Baio, A., & Kemokai, M. (2009), 'Fisheries and failed states: The case of Sierra Leone', *Marine Policy*, Vol. 33, pp. 393–400.

The Lebanese Customs Administration: Trade Statistics, available at http://www.customs.gov.lb/customs/trade_statistic.

UNRWA United Nations Relief and Works Agency for Palestine Refugees (2017), Where we work, available at <http://www.unrwa.org/where-we-work/lebanon>.

Weber, M. (1978), *Economy and society: An outline of interpretive sociology*, Edited by G. Roth & C. Wittich, Oakland: University of California Press.

World Bank (2009), *COED Lebanon Cost of Environmental Degradation*, Mediterranean Environmental Technical Assistance Program (METAP), 2 pp.

World Bank (2016). World Bank national accounts data, and OECD National Accounts data files. Agriculture, value added (% of GDP), available at <http://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=LB&view=chart>

Wikipedia (2017). South Governorate, available at https://en.wikipedia.org/wiki/South_Governorate.