

FISHERY COUNTRY PROFILE	Food and Agriculture Organization of the United Nations	FID/CP/SYR
PROFIL DE LA PÊCHE PAR PAYS	Organisation des Nations Unies pour l'alimentation et l'agriculture	
RESUMEN INFORMATIVO SOBRE LA PESCA POR PAISES	Organización de las Naciones Unidas para la Agricultura y la Alimentación	October 2007

THE SYRIAN ARAB REPUBLIC

I. GENERAL GEOGRAPHICAL AND ECONOMIC DATA

Area:	185 180 km ²
Water area (including marshes):	1 610 km ²
Shelf area:	900 km ²
Length of continental coastline:	183 km
Population (2005):	18 356 000
GDP at current market prices (2005):	US\$ 28 379 million
GDP per head at current market prices (2005):	US\$ 1 546
Agricultural GDP at current market prices (2005):	US\$ 6 142 million
Fisheries GDP (2005):	US\$ 23 338 370

NOTE: The exchange rate in 2005 was US\$ 1 = 52.14 Syrian Pounds (SP)

II. FISHERIES DATA

Data for 2005	Production	Imports	Exports	Total supply	Per capita supply
		tonnes live weight			kg/year
Fish for direct human consumption	16 128	25 660	10	41 778	2.4
Fish for animal feed and other purposes	0	-	—	-	

Estimated Employment (2005):

(i) Primary sector (including aquaculture):	13 252
(ii) Secondary sector:	7 550

Gross value of fisheries output (2005): US\$ 40 205 000

Trade (2006):

Value of fisheries imports:	US\$ 37 105
Value of fisheries exports:	US\$ 260 000

III. FISHERY SECTOR STRUCTURE

3.1 Overall fishery sector

The fishery sector plays a minor role in the Syrian economy, due not only to the scarcity of resources and the low natural productivity of fishing grounds, but also to technical, administrative and legislative constraints.

Small-scale fishery dominates in the marine. It comprises some 1200 coastal fishing vessels licensed to fish within the territorial waters (12 n.m.) along a coastline of 183 km. Real industrial marine fishery barely exists, except for 21 comparatively small offshore vessels operating beyond the 12 n.m. zone.

Artisanal fishery is the only capture fishery in inland waters with 1 283 small fishing boats, of which 436 are motored. Main inland water resources are located in the south and southeast of the country. Other resources in the western, central and coastal areas are considered marginal. Fishing communities are distributed accordingly.

Aquaculture is confined to fresh waters and mostly carps and tilapias. Semi-intensive farming is common in earth ponds, whereas intensive farming in cages is restricted to a few farms in big reservoirs. Capture-based aquaculture is carried out in surface-water retention lakes.

Capture fishery has been traditionally a source of living for poor and more-or-less illiterate people in coastal and lacustrine areas. The low output of capture fishery, particularly in inland waters, does not secure more than a minimum living for artisanal fishers. Fish farming and capture-based-aquaculture are an exception, being practised by comparatively rich and literate farmers and yielding high income.

Various approaches to aquaculture and possibly high seas capture fishery offer the most promising potentials for increasing national fish production, whereas capture fisheries in national waters are believed to have exceeded their sustainable production under current conditions.

3.2 Marine subsector

The first Syrian fishing vessel was licensed to fish exclusively beyond the territorial sea in 1995, and Syrian marine fishing operations extended beyond 12 n.m. zone. The fishing ground for the majority of the artisanal fleet is restricted to the zone of 1 to 5 n.m. over the continental shelf of a short strip of coastline (183 km). The Syrian shelf is known to be:

- Narrow (1 to 8 n.m.) with an average of 3 n.m.
- Rocky over three-quarters of its area, with a limited trawlable sandy and muddy area estimated to be 225 km².
- Have only single inhabited island and a few rocks.
- Void of coral reefs, caves or similar shelters essential for fish.
- Poor nutritionally, lacking any upwellings.
- The trawlable bottom being bare of meadows of *Posidonia oceanica*, torn out by excessive bottom trawling.

These factors combine to make the natural productivity of Syrian marine fishing ground relatively poor. This has been confirmed by several national and international studies. Damming the coastal rivers in the eastern Mediterranean and long-term excessive exploitation of the resource are believed to have had negative impacts on the potential yield of the Syrian continental shelf.

A comprehensive national referential study and field survey on aquatic biodiversity in the late 1990s highlighted use of explosives, bottom trawling, beach seining, death walls and over-fishing as major threats to marine life.

3.3 Catch profile

Annual catch from the sea fluctuated during the 1980s between 900 and 1 500 t/yr, while in the 1990s it began a gradual and steady increase, reaching 2 600 t in 1999 and 3 677 t in 2005.

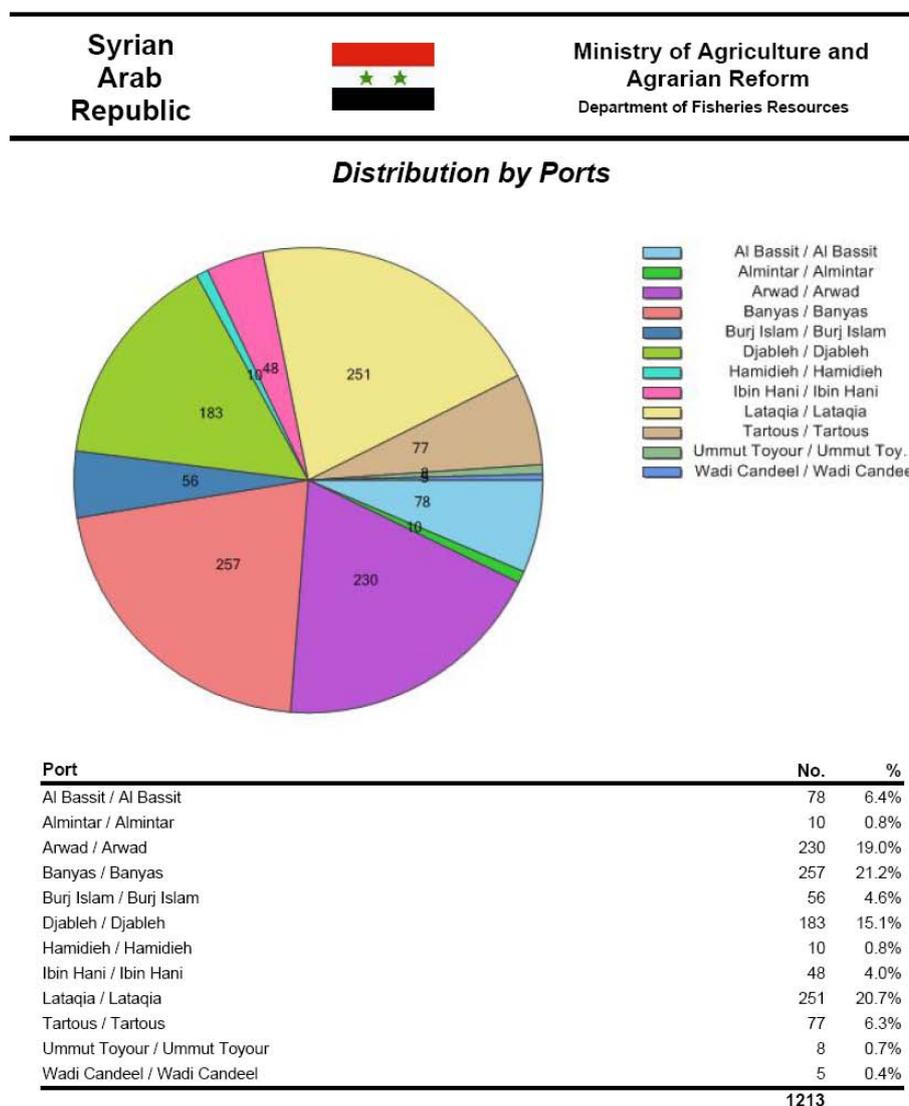
Catch data on species groups and quantities were taken in the past two decades from market auction places. In 2005, in the context of *MedFisis* Project of FAO, a parallel monitoring system started on landings directly at major landing sites on the coast.

Of demersal species, landings of finfish, crustaceans and molluscs in 2005 were 1 505 t (41% of the total marine catch); 215 t (6%); and 128 t (3%), respectively. The main demersal finfish groups are porgies and seabreams (609 t); scorpion fishes and allies (198 t); rabbitfishes (153 t); sharks and batoid fishes (135 t); hakes (110 t); red mullets (105 t); lizard fishes (105 t) and groupers (55 t).

Landings from pelagic and migrating species were about half of the total marine catch (1 829 t), comprising tuna and tuna-like species (731 t); sardines (518 t); scads, jacks and runners (259 t); grey mullet (179 t) and barracudas (142 t).

3.4 Landing sites

Fishing vessels usually land their catches in their home harbours. The major fishing harbours and landing sites are located in the major coastal cities and markets. In 2004, the Department of Fisheries Resources (DOF) identified ten major landing sites and established in each of them a small field office. The newly established Offices for Marine Fishery Rationalization (OMFiRs) took over responsibility for monitoring vessel activity, fishing gear and landings on a daily basis. Figure 1 shows the distribution of fishing vessels by ports on the Syrian coast.



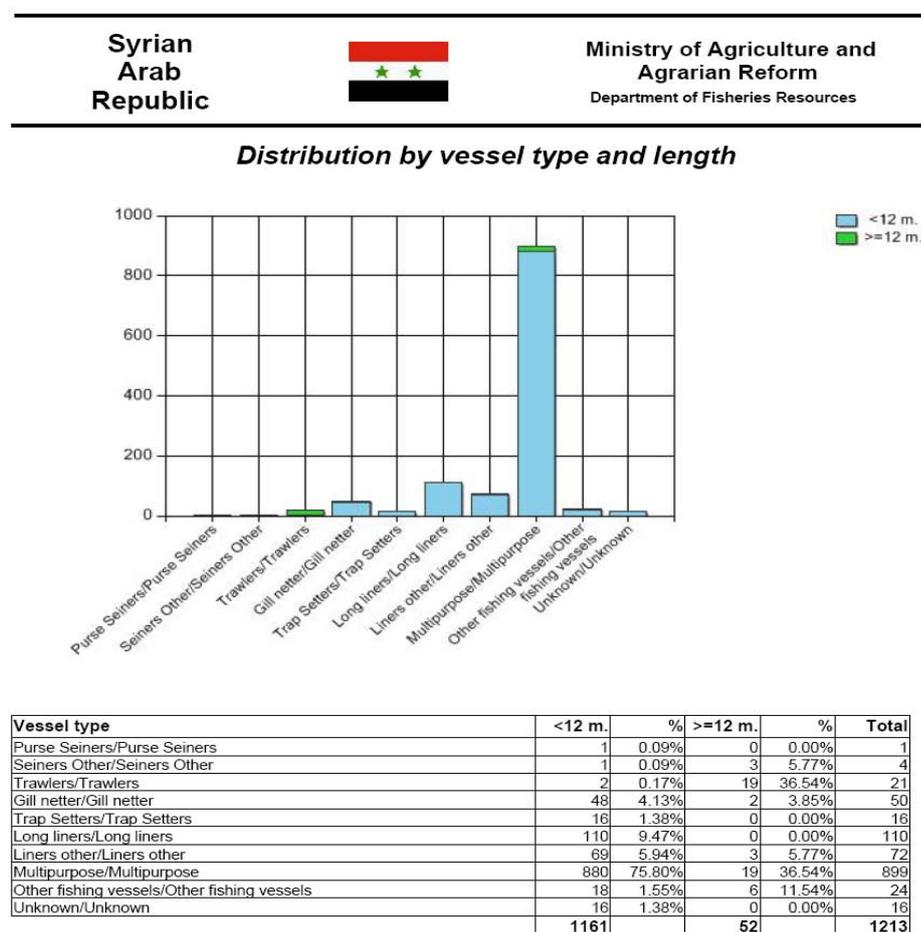
3.5 Fishing production means

Small-scale fishery dominates in the marine sector. All the artisanal fleet is locally constructed, the majority of wood, while some are made of reinforced plastic and a very few of steel. The engines are mostly between 5 and 150 hp. Vessels over 12 m form 4.3% of the fleet. Some 525 fishers are beach-based, using beach seines, or they swim or dive to set the gear and collect the catch.

The Syrian artisanal fishery is a multi-species fishery with multipurpose/polyvalent vessels operating a wide variety of gear in different seasons. Although licensed to fish in territorial waters, the actual activity of artisanal fishing vessels is restricted to the inshore area of the very narrow continental shelf. The so-called industrial fleet is not more than 21 vessels of 16–28 m LOA, 40–150 GRT and inboard engines of 120–660 hp. These are licensed to fish exclusively outside territorial waters.

It is worth mentioning that fishing effort in coastal fishery gradually increased from the 1980s, with effort more than doubling by 2005. The number of vessels more than doubled, and the fleet power almost trebled.

Based on the outcome of the census on marine fishing means, carried out with the technical support of *MedFisis* Project of FAO, the fleet is now as shown in Figure 2.



Gear employed in the marine fishery includes gill nets and entangling (60.1% of vessels), hook-and-line (24.3%), purse seines (4.1%), traps (4.1%), trawls (1.6%) and other, unspecified, gear (5.8%). The dominating multipurpose/polyvalent vessels make a successive use of gear (trammel nets, hook-and-line and lamparas) according to seasons. Illegal use of explosives is diminishing as a result of serious control.

IV. MAIN RESOURCES

Demersal species versus pelagic and migrating species contribute equally to the marine fishery. The five most important species-groups (by weight) in the marine capture fisheries in 2005 were tuna and tuna-like species (731 t); porgies and seabreams (609 t); sardines (518 t); scads, jacks and runners (259 t); and scorpion fishes and allies (198 t).

V. MANAGEMENT APPLIED TO MAIN FISHERIES

For decades, the trawl fishery and the artisanal fishery have been in severe competition for the same resources and almost on the same fishing ground. The annual catch per unit effort (CPUE) has shown an erratic but steady decline since 1986, dropping markedly in 1995 and 2003. Based on the low CPUE, the large proportion of small-sized fish in the landings (mostly smaller than size at first maturity) and the marginal return to fishers, the fishery was considered overexploited. A policy has been adopted, objectives have been agreed upon and a strategy has been designed accordingly.

The policy of marine fishery management is expressed in two points:

- Rationalization of exploitation of living resources in the territorial sea.
- Extension of national fishing capacity to the Syrian EEZ, underutilized Arab resources and eventually the high seas.

The objectives and goals of the management plan are to:

- Rehabilitate damaged fishing grounds.
- Minimize excessive fishing pressure on endangered stocks.
- Maintain ecodiversity and protect biodiversity.
- Secure sustainability of the resource.
- Investigate the potentials of the Syrian EEZ.
- Integrate national capacities with Arab resources.

The strategy applied adopts the following fundamental concepts:

- Long-term breaching of fishery laws and regulations needs to be urgently dealt with, precautionary measures taken and limitations imposed to reinforce breached laws and regulations.
- Taking into consideration the need for sustaining a given income for fishermen during rehabilitation phase, changes should be implemented progressively in order that new measures do not lead to drastic decrease in catches.
- Sufficient information on the stocks as to catches, species composition, individual sizes and seasonality are to be regularly collected.
- Concurrent scientific research on various biological aspects of major endangered species in general, with the emphasis on "size at maturity" in particular, are to be carried out.

The management measures applied include:

- Technical measures:
 - Declaring a closed area "Ibn Hani" in Lattaqia as natural protectorate for marine life (2000).
 - Imposing closed areas on purse seines (<40 m depth for big gear, and <25 m depth for small gear) (May 2003)
 - Imposing closed seasons for sardines (15 March–30 April and 16 July–15 August) and for traps (1 November–31 May) (May 2003).
 - Enforcing minimum mesh size for gill nets (16 mm for 1 year, then 20 mm for 2 years, to a final 25 mm by end of 2008), for purse seines (14 mm), and mesh size for traps (Ø 35 mm) (May 2003).
- Input controls:
 - A ban on new vessels entering the fisheries (June 2002).

- Freezing the existing fishing effort as to number of vessels, GRT and horse power (June 2002).
- Fixing a maximum number of gear per vessel (May 2003).
- Limiting of purse seining hours per day (sunset to sunrise) (May 2003).
- Banning bottom trawls in territorial waters from January 2004 (May 2003).
- Banning beach seines from 2007 (May 2003).
- Output controls:
 - Assigning minimum sizes for commercial fish species (not to be enforced as long as progressive limiting measures are being introduced).
- Economic incentives:
 - Providing soft loans exclusively for registered owners of beach seines in order to build fishing vessels and/or procure alternative fishing gear.
 - Offering bottom trawlers permission to modify vessels and/or gear for eventual licensing for EEZ or high seas fishing.
 - Convene an agreement with Yemen to host some Syrian offshore fishing vessels.

VI. FISHERMEN COMMUNITIES

A few decades ago, marine fishermen communities were considered to have a good living standard. Nowadays, this is not the case. Some may have kept a reasonable living standard, but the most seem to have suffered economically. Literacy in older generations is minimal. Family size is usually big enough, i.e. 6 to 8 persons or even more.

VII. INLAND SUBSECTOR

The natural and manmade continental water resources cover round about 1370 km². Marshes add some 240 km². Syria possesses no natural lakes, all such waterbodies result from damming rivers and seasonal rainwater flows.

Rivers running through Syrian territory have a total length of 2474 km. Crossing the Syrian-Turkish border, the *Euphrates* runs 680 km south-westerly before passing to Iraq. The *Khabour* passes southwards from the Syrian-Turkish border for runs 402 km and then discharges into the *Euphrates* near *Bseirah* town in the northeast of Syria. The river *Orontes* crosses the Syrian-Lebanese border and runs 366 km northwards. The *Euphrates* together with its artificial lakes—*Tishreen*, 16 600 ha; *Al-Assad*, 67 400 ha; and *Al-Ba'eth*, 2 700 ha—are the major strategic water arteries and reservoirs, and also the main inland fishery resources. The rivers *Khabour* and *Orontes*, together with their small lakes, rank second. Several short coastal and a few southern rivers contribute partially to inland fishery.

Formed in 1974 and classified in 1976 as oligotrophic, lake *Al-Assad*, with its deep central water mass is not suitable for riverine fish. Its productive area is restricted to its peripheral zone (<4 m depth) around its shallow banks. This is the case for most of the lakes on the coastal rivers running among hills. Shallow lakes are usually productive over almost all their area.

7.1 Catch profile

Catch data has been recorded for the past two decades based on the whole fish markets. Starting from 1955, landing sites and fishing watch-points started to be established on major water bodies in the context of inland fishery development projects. Since then, a parallel monitoring system on landings at major landing sites has been launched.

The Cyprinids represent the major fish group (3 205 t) (67% of the total catch in inland capture fishery). Catfishes contributed 625 t (13%); mullets, 558 t (12%); tilapias, 212 t (4%); and eels, 142 t (3%) (2005 data).

The *Euphrates* with its lakes ranks first in inland capture (4 127 t), while *Khabour*, *Orontes* and coastal rivers contribute modestly: 316 t, 216 t and 111 t, respectively (2005 data).

7.2 Landing sites

Landing sites are small and numerous along the shores of the lakes and banks of the rivers. Size of landings varies markedly, being comparatively big on the south shores of lakes *Tishreen* and *Al-Assad* in the north of Syria.

7.3 Fishing production means

Artisanal fishery is the only capture fishery in inland waters. Small-scale fishing vessels (3–5 m LOA) dominate in river fishery, where vessels are open, made of steel and hand powered. Long sticks or oars are used for steering. The vessel rides the water current and floats downstream unfolding the gill net. The net is left to drift behind for a kilometre or so then raised on board with the catch. After several such drifting operations, the boat finally lands at a landing site and goes back upstream on the road on a truck. Comparatively bigger vessels (6–15 m), of which some are decked, motored (5–30 hp) and built of wood or fibreglass (GRP) are used in lake fishery. In lakes, single-sided gill nets are used as set nets. Fyke nets are sometimes used in rocky areas, and cast nets in shallow waters. 1 283 fishing boats were registered in inland fishery, of which 436 were motored. Some 780 fishers were beach-based. Detrimental fishing practices also exist, with electric shock and explosives presenting a serious threat to aquatic life and the sustainability of the resources.

7.4 Main resources

All freshwater fish species in Syria are riverine, including those in the lakes, having more-or-less successfully adapted to lacustrine conditions. It is worth noting that the exotic common carp (*Cyprinus carpio* L.) has efficiently established itself in all freshwater systems in Syria. In the *Euphrates* system, common carp has been grown for the past three decades in cages in lake *Al-Assad*, whence from undersized fingerlings have escaped to open waters, or cage stocks dispersed following storm damage to cages. Common carp has also become dominant in the *Orontes* system as escapes from surrounding earth ponds and drainage canals. Two authentic freshwater species: the giant barbel (*Barbus esocinus* Heckel) and the *Rumi* barbel, (*Barbus grypus* Heckel) are highly threatened owing to damming, and absence of spawning grounds or fish passes. Another species, leopard barbell (*Barbus subquincunciatus* Heckel) has almost disappeared.

7.5 Management applied to main fisheries

The policy of inland fishery management aims to "rationalize the exploitation of the resources".

The objectives/goals of the management plan and the fundamental concepts of the strategy resemble those of marine fishery.

The management measures applied in inland fishery are classified as follows:

- Technical measures:
 - Declaring closed areas: *Al-Djabboul* a saline marsh in the north near Aleppo as natural wetland protectorate for euryhaline fish species and waterfowl (1997); *Mhardeh*, an artificial lake in central Syria on the *Orontes* near Hamah (1998); the small branch of the *Euphrates* in Deir Ez-Zor in the east (2001); and *Wadil-Qarn*, a retention lake in the south near Damascus (1997), have all been declared natural protectorates for freshwater life.
 - Imposing closed seasons for fishing in inland waters (15 March–30 May) (1965).
 - Enforcing minimum mesh sizes for gill nets, cast nets and traps (30 mm), and for trawls and beach seines (50 mm) (1965).
- Input controls:
 - Banning new vessels from entering the fisheries (2002).
 - Freezing existing fishing effort in terms of number of vessels, GRT and horse power (2003).
 - Banning bottom trawls in inland waters for a transitional period of three years (May 1987).
- Output controls:
 - Random checking on backbone solidity, gill bleeding, body cohesiveness and air bladder.

- Economic incentives:
 - Providing access to easy loans from the agricultural bank for cooperative fishermen to procure gear and boats, provided that the applicant for a boat is replacing an existing licensed boat.

7.5 Fishermen communities

Inland fisher communities are known to have a poor standard of living, while workers in the secondary sector usually earn higher incomes for less effort. Inland fisherman are either traditional river fisherman or new entrants to fishery from the agricultural sector following inundation of agricultural land as a result of damming. Literacy in general is basic, and family size is usually big enough, i.e. 8 to 10 persons or more.

VII. RECREATIONAL SUBSECTOR

Recreational fishery is not much developed in Syria and is limited to angling. Anglers are given annual licences from the local fishery authorities. The licence validity is confined to water bodies within the administrative area. The angler is allowed to use a maximum of three hooks and requested to respect closed seasons. Output limits are not yet set, but the angler is not supposed to earn his living from angling. Recreational fishing licences were 148 marine and 257 in inland waters.

IX. AQUACULTURE SUBSECTOR

Modern aquaculture dates from the late 1950s. It is exclusively practiced in fresh waters and restricted to warmwater fin fish. Production increased during the 1990s from 3 253 t to 6 797 t by 2000, reaching 8 533 t in 2005, with an estimated value of 820 million Syrian Pounds (\approx US\$ 15.73 million).

Commercial aquaculture has, so far, been limited to two fish groups: carps and tilapias. The common carp (*Cyprinus carpio*) and the tilapias, which are believed to be a mixture and random hybrids of *Oreochromis aureus* and *Oreochromis niloticus*, contribute almost equally to aquaculture production: 3 920 t and 3 363 t, respectively. African catfish (*Clarias gariepinus*), the culture of which is confined to the few warm springs, is gradually becoming a considerable component (1 208 t). Grass carp (*Ctenopharyngodon idella*) and silver carp (*Hypophthalmichthys molitrix*), introduced respectively in 1975 and 1994 as secondary species in fish ponds, contributed 30 t and 12 t in 2005.

As to production practices, pond culture predominates (88%), while cage culture in big reservoirs and capture-based aquaculture in small barrages contribute the balance. These proportions reflect their production values.

With the exception of the few governmental fish farms that use pelleted fodder, private fish farms depend on barley, wheat bran, cottonseed cake and different inedible cereals. In cases of shortcomings, slaughterhouse by-products, illegally, find their way to private fish ponds. Cage culture is carried out solely with common carp being fed with pelleted fodder. In capture-based aquaculture, common carp coming from restocking dominates the wild Cyprinids and Cichlids. Productivity of barrage lakes is sometimes enhanced by inedible cereals and different by-products from the feed industry. Aquaculture productivity, accordingly, varies from 0.3 to 0.8 t/ha/year in barrages, 4–16 t/ha per season of 7 months in earth ponds, up to 20–35 kg/m³ per 7 months in cages.

Except for cage culture of common carp in medium to large batteries of cages, each of individual size of 35 to 300 m³, aquaculture enterprises are considered small-scale; the majority of fish farms are comparatively small (0.5–5 ha). Nevertheless, these provide a good living in comparison with other agricultural activities.

The policy of aquaculture management is expressed in two points:

- Promote sustainable and environmental friendly aquaculture in inland and marine waters.
- Integrate aquaculture with agricultural and irrigation activities whenever and wherever possible.

The objectives/goals of the management plan are to:

- Secure sustainability of inputs in future projects.
- Investigate the potentials of neglected, unconventional and underutilized resources.

- Make intensive but rational use of limited water resources, keeping an eye on aquatic environment.

The management measures applied to materialize aquaculture policy are:

- Issuing regulatory resolutions for farming of fish and other aquatic organisms (1991 and 2004).
- Banning the use of raw slaughterhouse by-products for fish feeding.
- Identification of neglected water resources (irrigation canals¹, drainage canals¹ and surface water retention lakes), land resources (salinized land areas unsuitable for arable agriculture¹), developing simple fish farming techniques therein¹, establishing administrative frameworks with relevant authorities and lobbying for implementing appropriate concepts.
- Diversification of cultured species by introducing herbivorous carps and establishing a specialized hatchery.
- Introducing aquaculture to the most promising potential area: the *Euphrates* region being rich in water, land and human resources; and supporting new entrants to aquaculture with fingerlings, expertise and some incentives.

X. POST-HARVEST USE

10.1 Fish utilization

National outputs from capture fisheries and aquaculture are totally consumed fresh. The modest production level precludes sufficient surplus for even a small processing plant.

10.2 Fish markets

Location or size of landings on a specific landing site from the capture or farming does not reflect its spatial relative importance as to fish consumption. Landing sites can be major fishing harbours, fishers' villages or farms, where marketing agents collect the catch or the harvest and transfer it to the main fish markets. Main freshwater fish markets are Aleppo in the north, Raqqah and Deir Ez-Zor in the northeast and Hims and Hamah in the mid-west of the country. Coastal cities—Lattaqia and Tartous—are the main marine fish markets. Damascus, the capital in the south, is a big market for both freshwater and marine fish

Simple marketing chains starting from contractors and ending in markets do not exclude side or direct deals between producers and retailers or even consumers.

XI. FISHERY SECTOR PERFORMANCE

11.1 Economic role of fisheries in the national economy

Agriculture has traditionally been the mainstay of the Syrian economy, contributing to GDP at current market prices with 22 percent (2005). There is little economic information on the real role of the fishery sector in the national economy. The value of fishery GDP contributed 0.38 percent to agricultural GDP in 2005 (Author's estimate derived from official statistical data). However, with associated industries (fishing vessels, gear, fodder) and with services (marketing, transport, cooling, maintenance and value-added secondary processes), the figure is considered to reflect the contribution of the fishery sector to the overall national economy.

11.2 Demand

The demand for fish and fish products is believed to be much bigger than the actual supply, but assessment is difficult since neither has supply ever exceeded demand nor fish markets ever witnessed a surplus. The national fish market could easily, but gradually, absorb additional inputs to at least double the present level. Nevertheless, the limited economic capacity of Syrian consumers would necessitate that the retail price be within the range of US\$ 3–5/kg.

¹ In the context of "Inland Fishery Development Project" (IFAP) 1993-97, carried out in collaboration with COFAD/GOPA under GTZ of Germany.

11.3 Supply

National fish production supplies the market with 0.925 kg per capita per year. The balance of import-export of soft fish (2 115 t) adds some 0.115 kg. If imports of canned sardine and tuna are included, the total per capita supply is 1.9 kg/year.

The contribution of soft fish supply to population consumption of animal protein is 3.3%, with the balance from milk and dairy products (46.1%), red meat (24.4%), chicken (15.3%) and eggs (10.9%) (2005 data).

11.4 Trade

Neither import nor export of aquatic products was permitted in the period 1975–1999. Imports in 2005 were 2 292 t of fresh and frozen fish, 15 670 of canned tuna and sardines, 431 t of fish oil, and 2 t of ornamental fishes, while registered exports were limited to 177 t. Hence, the contribution of the fishery trade to foreign exchange earnings is very low.

11.5 Food security

Being still modest, fisheries and fish products contribute modestly to food security. Nevertheless, aquaculture is qualified to contribute selectively to improving animal protein supply. This could be achieved through application of improved farming techniques, including:

- crop culture, such as fish culture rotation in salinized lands;
- herbivorous fish culture in drainage and irrigation canals; and
- fish culture in family fish ponds, relying on house waste and farm by-products.

These, together with other integrated production systems and marine fish farming, would make better use of occasional, seasonal, unconventional and partially or completely unused resources and would partially relieve malnutrition, thus contributing effectively to food security.

11.6 Employment

Human resources directly engaged in capture fisheries, both marine and inland are some 10 000, out of which 6 400 are full time, 1 700 are part-time and 1 600 are occasional. Aquaculture and capture-based-aquaculture involve 950 owners and over 1 350 labourers on a full-time employment basis. The aquaculture producer at the state level, i.e. the General Establishment for Fishes, employs an additional 391 labourers. Other seasonal aquaculture activities provide further employment opportunities on a part-time basis for some 1 800 labourers.

The secondary sector (input-production, maintenance, transportation, storing, trading and other services) is estimated to provide 7 550 jobs.

If the governmental managing body, the Department of Fisheries Resources (DOF), is included, another 666 employees can be added. Hence, the fisheries and aquaculture sector sustains round about 20 800 families, implying 125 000 to 165 000 people on a full- or part-time employment basis.

11.7 Rural development

Unlike some economic and agricultural activities, fisheries and small-scale aquaculture imply a day-by-day involvement of the whole rural family. The newly introduced techniques for exploitation of salinized lands for aquaculture opens a new horizon for land owners to revert to being their own masters. Farming of herbivorous fishes in irrigation and draining canals, the rights of which are exclusively granted to poor people with no other source of income, secures a reasonable income for additional provincials. Periodic harvesting of oversized fishes from integrated family fish ponds provides domestic food, moderating the seasonality of agricultural income and adding nutritional value to the family diet. Thus, fisheries and aquaculture are can create a source of income for a significant proportion of rural society, contributing to alleviation of unemployment and poverty in rural areas and minimizing rural-urban migration.

XII. FISHERY SECTOR DEVELOPMENT

12.1 Constraints

The fishery sector is faced with environmental, administrative, marketing-infrastructure and expertise constraints. Detrimental fishing represents the major environmental hazard to stock size, aquatic biodiversity and ecodiversity, due to electric shock fishing in inland fishery and explosives in marine fishery. Overfishing and sometimes pollution are also problems.

Aquaculture, which seems to have the most potential for further production and an attractive option for investment, is indirectly hampered by some extra-sectoral driving forces. Expansion in cage culture and capture-based aquaculture, as well as initiation of fish farming in irrigation canals encounter exaggerated fears of water pollution or harm to the canals. DOF negotiations with water authorities aim to bring about a realistic understanding of rational and environmental friendly aquaculture.

The infrastructure of fish marketing chains mostly suffers from limited cold chain facilities, including suitable insulated and cooled transport containers.

The scarcity of expertise in several fisheries and aquaculture fields and the limited attendance of Syrian fisheries officers at meetings, workshops or conferences seriously constrains development.

12.2 Development prospects and strategies

Fisheries and aquaculture development prospects lie in the following:

- Promoting sustainable aquaculture used proven techniques, minor or underexploited resources and promising areas.
- Making sufficient and rational use of existing water resources through culture-based fisheries in irrigation and drainage canals and surface water retention lakes, and integration of fish farming into agricultural activities and irrigation systems.
- Upgrading the landing facilities and other pertinent services for fishers.
- Re-establishing the biological connections among the Euphrates segments and artificial lakes through fish passes for spawning.
- Taking necessary steps to play a key role in exploitation of the Syrian EEZ and convene bilateral agreements with Arab countries for exploitation of underutilized marine living resources.
- Intensifying scientific research on stock assessment, MSY and needs for reorganization or redistribution of fishing means.
- Upgrading the technical and managerial capacities of fisheries officers.
- Coordinating efforts with neighbouring countries for harmonization of marine fisheries policies and management measures.
- Participating actively in Arab, regional and international fisheries organizations, particularly in relation to the management of migratory fish stocks.

12.3 Research

Faculties of agricultural sciences and those of sciences in the Syrian universities are more or less qualified for carrying out fisheries and related researches. The University of Tishreen in Lattakia is active in studying the biology of some species. Of research institutions, the High Institute for Marine Research (HIMR) is important in this respect. Research projects mainly deal with identification of living marine resources, measuring pollution levels in marine water, sediments and marine organisms and studying ecological criteria of the coastal waters. It can be contacted at <dean-himr@tishreen.shern.net>.

12.4 Education

Education in the fields of fisheries and related areas is elementary, being restricted to a single course in aquaculture in the curricula of the faculties of agriculture. The first course dates back to the late 1970s in the University of Damascus. A few postgraduate study programmes at MSc and PhD level

have been introduced in the universities of Tishreen, Damascus and Aleppo, where a few degrees have been awarded.

12.5 Foreign aid

The Inland Fisheries & Aquaculture Development Project (1993–97), technically supported by COFAD/GOPA under GTZ of Germany, introduced innovative concepts for developing inland aquaculture.

Another significant milestone, in the marine subsector, was the subregional project *MedFisis* of FAO, aiming to promote fishery statistics and information systems in the eastern Mediterranean, and was started in 2004. A complete field census of fishing vessels and gear was systematically carried out, and then followed by regular data collection on catch and effort. This provided an extraordinary opportunity for DOF to modernize its information system and, in the long run, to reconsider its management measures aiming to achieve resource sustainability. The substantial investments made by Syria, through establishing ten field offices for marine fishery rationalization (OMFiRs) and assigning considerable qualified human staff, were recognized by FAO *MedFisis* as a real commitment and considered an example for other countries struggling with establishing a fisheries information and statistics system. This also encouraged the FAO *MedFisis* project to plan for continuation of its support to DOF in a pilot phase on management-oriented assessment of catch-effort.

The Syrian Arab Republic expects the forthcoming project EASTMED to consolidate the Syrian statistics and information system and help achieve a proper and sustainable management of its marine fishery.

12.6 Further promotion needs

The Syrian fisheries sector needs further promotion in different aspects. The top five issues on the priority list would be:

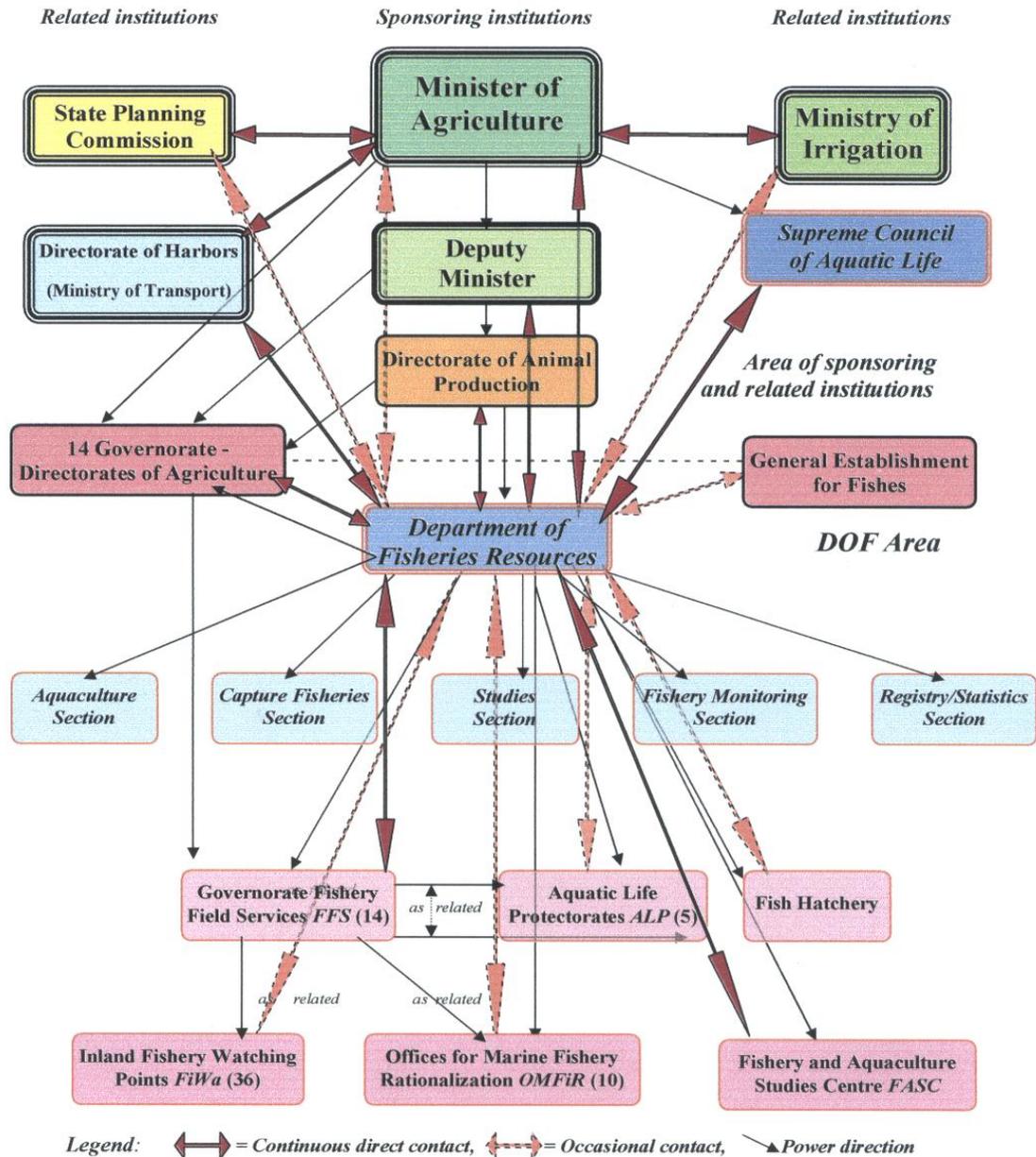
- A socioeconomic study of the fishers' societies in the Euphrates region to be used as baseline for dividing the *Euphrates* and its artificial lakes into well defined segments in which fishing rights be assigned to fishers' societies or contractors on the basis of fish quotas.
- Re-establishing the connections among the *Euphrates* segments and its three artificial lakes through fish passes to stimulate spawning of highly threatened native species.
- Considering the introduction of an environmentally and biologically suitable lacustrine fish species into lake *Al-Assad* in order to make use of its huge central and deep, so far unproductive, water volume, estimated to be around $11 \times 10^7 \text{ m}^3$ out of a total of $14.1 \times 10^7 \text{ m}^3$.
- A comprehensive and continuous research programme of studies on the shared stocks in the east Mediterranean subregion to provide the foundation for proper and harmonized management of living resources on a sustainable basis.
- Upgrading of skills of DOF lead officers and field extension officers, which remain one of the significant constraints on real development of the sector.

XIII. FISHERY SECTOR INSTITUTIONS

The fishery sector is managed by the Department of Fisheries Resources (DOF), established in the Ministry of Agriculture and Agrarian Reform in 1986. DOF proposes and implements fishery policy and strategy, drafts relevant legislation, sets regulations and instructions for capture fisheries, aquaculture and related activities, and plans for and implements fishery development projects. It also considers the introduction of new fish species, and introduces, tests and spawns them as preliminary steps toward adopting them in aquaculture. It is also authorized to issue statistical data on the sector, in addition to import and export approvals for fish and fishery products and prerequisites, including new marine fishing vessels. DOF represents the country in relevant international, Arab and regional organizations.

With its headquarters in Damascus, DOF has 14 Fishery Field Services (FFS), under the 14 Directorates of Agriculture in the 14 Governorates of Syria. An FFS may cover 1–12 peripheral fishery related sites; watching point(s); marine fishery offices; a reserve area; a hatchery; or a study

centre, as locally needed (see the organigram). The FFS is responsible for implementing DOF strategy and plans in its area, licensing capture fishery and aquaculture and leasing aquaculture and fishing rights in surface-water retention lakes and canals, controlling fisheries activities and enforcing the laws on protection of aquatic life, monitoring fish markets, prices, demand, species, etc., and extending training, extension and advice to fish producers.



Organigram of the Department of Fisheries Resources (DOF), showing its location under the Ministry of Agriculture, its structure and nature of its relations with other institutions.

Vital issues with certain impact on the sector, such as new policies, or modifications of fishing rights or regulations, are proposed by DOF to the Supreme Council of Aquatic Life (SCAF), to be decided upon and endorsed. SCAF comprises high-level representatives of pertinent ministries, transport (harbours authority), irrigation, local authority and environment, finance, social affairs and labour, interior and high education. The attitude of those ministries, according to their specific fields of responsibility, can, in one way or another, affect the outcome of DOF policy.

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XIV. GENERAL LEGAL FRAMEWORK

In harmony with the public laws in force, the activities of fishery sector are governed by the following major laws and regulations:

- The Law on Protection of Aquatic Life (Legislative Decree No. 30 of 1964):
A comprehensive law that sets the framework for the fishery sector, including marine and inland capture, aquaculture and water environment, identifying legal and illegal fishing practices, and constituting the Supreme Council for Aquatic Life under the chairmanship of the Minister of Agriculture, assigning to it the responsibility for endorsing the national fisheries policy.
- Resolution on Regulation of Marine Fishery (No. 460 of 1965):
Sets further rules and regulations for marine capture fisheries, identifying legal and illegal fishing practices.
- Resolution on Regulation of Inland Fishery (No. 1983 of 1965):
Sets corresponding rules and regulations for inland capture fisheries.
- Resolution on Regulation of Fish Culture and Licensing of Fish Farms (No.12/t of 1991):
Sets legal and technical criteria for licensing different types of fish farms: conventional pond, coastal fish farms, inland and marine cage culture, closed fish farms using re-circulated water system, valiculture, and fish culture in irrigation water reservoirs in agricultural lands.
- Resolution on Regulation of Farming of Aquatic Organisms Other than Finfish (No. 8/t of 2004):
It sets criteria for licensing the farming of aquatic organisms other than finfish: bivalves, frogs and aquatic mammals and reptiles.
- The National Strategy and Work Plan on Biological and Ecological Diversity (officially endorsed by the Syrian Government in 2001):
The governmental authorities are requested to reconsider their practices and reorganize their activities to attain negative impact on aquatic life, and to take necessary steps to protect endangered species, and to sustain and rehabilitate damaged habitats.
- Resolution on specifications of imported frozen fishes (No. 86/t Of 2003):
It defines safety and health criteria for imported aquatic organisms, and sets the biological and chemical tests to be made.