



Abu Dhabi Fisheries & Aquaculture Bulletin

Fisheries and Aquaculture Production
in the Emirate of Abu Dhabi – 2019

The Environment Agency - Abu Dhabi (EAD) was established in 1996 to preserve Abu Dhabi's natural heritage, protect our future and raise awareness about environmental issues.

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About EAD

Established in 1996, the Environment Agency – Abu Dhabi (EAD) is committed to protecting and enhancing air quality, groundwater as well as the biodiversity of our desert and marine ecosystem. By partnering with other government entities, the private sector, NGOs and global environmental agencies, we embrace international best practice, innovation and hard work to institute effective policy measures. We seek to raise environmental awareness, facilitate sustainable development and ensure environmental issues remain one of the top priorities of our national agenda.





Acknowledgements

This bulletin provides information on commercial fisheries and aquaculture activities in the Emirate of Abu Dhabi and is a direct result of enhanced cooperation and information sharing between a number of government entities, without which the publication of this bulletin would not have been possible.

Gratitude goes out to the Ministry of Climate Change and Environment (MOCCAE), who leads, in partnership with the Environment Agency – Abu Dhabi (EAD), the 'UAE National Framework for Sustainable Fisheries (2019-2030)', as well as initiatives on developing the aquaculture industry for the UAE.

EAD is thankful to the Critical Infrastructure & Coastal Protection Authority (CICPA) and the Fishermen's Cooperative Societies in Abu Dhabi and Delma Island for the supportive provision of their datasets critical to the compilation of fisheries statistics.

Special thanks go out to the Statistics Centre - Abu Dhabi (SCAD), which assists the EAD in the realisation of the bulletin presented.

Last, but not least, appreciation is awarded to all fishermen and aquaculture workers who volunteered their time and dedication to provide us with valuable information on the operations of commercial fisheries and fish production in the Emirate of Abu Dhabi.

Special thanks to the EAD team and staff from Fisheries Management section and Aquaculture section for their contribution to the preparation and completion of this report.



Figure I - Fisheries enumerator recording landing data at Free Port landing site.



Summary

This bulletin outlines the landing statistics of commercial fisheries, the resources status indicators and an overview of aquaculture production in the Emirate of Abu Dhabi in 2019. The information presented contribute to EAD's strategic goal of developing a management regime for the fisheries and aquaculture production in Abu Dhabi Emirate and is produced by the fisheries and aquaculture teams of EAD.

Fisheries Statistics

The year 2019 was marked by the absence of two of its main commercial fisheries. Ghazal net fishing operations were banned in the Emirate of Abu Dhabi throughout the year, while the Gargoor ban was effective from 1 May 2019 onwards. The two closures had a significant impact on the total production and wholesale value attained.

An estimated 2,230 tonnes of fish were commercially landed in the Emirate of Abu Dhabi during 2019, which is only 46% of the total production of 4,892 tonnes in 2018. The major landing sites were Free Port (941 tonnes) and Al Marfa (489 tonnes). In the absence of Gargoor and Ghazal fisheries, Tarad - Hadaq became the most important fishery, landing more than 1,065 tonnes, or 48% of the total production.

The total wholesale value of landed catch decreased by 61% from 120.5 million AED in 2018 to 46.9 million AED in 2019. The huge drop in the value attained in 2019 is due to the closure of two of Abu Dhabi's most productive fisheries. Compared to other landing ports, Free Port yielded the highest earnings with 19.0 million AED or 41% of the total wholesale value generated in Abu Dhabi Emirate.

Resources Indicators

The UAE National Framework for Sustainable Fisheries (2019-2030) monitors the achievement of its overall objective 'Sustainable fisheries for the UAE by 2030' through two Key Performance Indicators:

- I. Sustainable Exploitation Index (SEI) describes the trend in the proportion of the catch volume of sustainably exploited species against the total volume of assessed species landed in Abu Dhabi Emirate. This is measured by progress towards an increase in the index from 8.4% for all species in 2017, toward a target of 70% in 2030. Due to the closure of two fisheries that specifically targeted over-exploited species, the SEI value jumped from 5.7% in 2018 to 29.3% in 2019. The SEI target for the year 2019 was set on 9%.



Figure 2 – Inspection visits to permitted farms are conducted twice a year to ensure environmental compliance.

2. Mean relative adult stock size (Mean SBR) describes the proportion of the average adult stock size for three commercially exploited key species (Hamour, Shaari and Farsh) compared to its virgin, unexploited size. This is measured as progress towards an increase in mean SBR from 6.6% average in 2017 to 30% in 2030. The SBR increased from 7.6% in 2018 to 8.1% in 2019 which increase is attributed to natural variation.

Aquaculture Production

This bulletin provides information on Abu Dhabi's aquaculture sector as it stands today in terms of production in volume and value.

In 2019, there were five permitted aquaculture operations in the Emirate of Abu Dhabi contributing to a total aquaculture production of 527 tonnes of seafood with a farm gate value of approximately AED 18 million. Hamour (*Epinephelus coioides*) and Indian white prawns (*Penaeus indicus*) dominated production.

Introduction

The Ministry of Climate Change and Environment (MOCCAE), in collaboration with the Environment Agency–Abu Dhabi (EAD), implements the UAE National Framework for Sustainable Fisheries (2019-2030) with the following strategic objectives to achieve sustainable fisheries in 2030:

1. Reduce Pressure on the Fishery, and
2. Develop Aquaculture Research and Programmes to support fish stock improvement,
3. Enhance Fish Stocks.

The status of UAE's fisheries resources, the socio-economic conditions, and the fact that sound fisheries management is a strategic priority for the government justified the establishment of the framework, which is a follow up of the UAE Sustainable Fisheries Programme that run for four years between 2015 and 2018. The status of Abu Dhabi's fisheries resources is summarised as follows and illustrated in Figure 3:

- Out of 28 species for which stock assessments have been conducted, 12 species are harvested beyond sustainable levels (over-exploited), accounting for 61% of the total landings and 77% of the wholesale value in 2019.
- Abu Dhabi's principal fish species Hamour (*Epinephelus coioides*), Farsh (*Diagramma pictum*), Safi Arabi (*Siganus canaliculatus*), Qabit (*Rhabdosargus sarba*), Zuraidy (*Gnathanodon speciosus*) and Kanaad (*Scomberomorus commerson*) are being fished, on average, 3.5 times the sustainable limit and these resources are considered severely over-exploited.
- Other over-exploited species are Dhil'e (*Scomberoides commersonianus*), Shaari (*Lethrinus nebulosus*), Kofar (*Argyrops spinifer*), Jesh Um Al Hala (*Carangoides bajad*), Eshnenuh (*Cephalopholis hemistiktos*) and Marjaan (*Lutjanus argentimaculatus*).

There is a critical need to move from the current 'severely overexploited' state of the fishery toward a 'recovering' and finally by 2030, a sustainably managed fishery. Although given the slow rate of recovery in fish stocks and the shared nature of some of them, this target is highly ambitious. The UAE National Framework for Sustainable Fisheries (2019-2030) is a change management process at the federal level, strengthening UAE institutional framework with the MOCCAE leading the way and continued support from strategic partners including Critical Infrastructure and Coastal Protection Authority (CICPA), Federal Transport Authority – Land and Maritime (FTA), and the EAD. But, foremost, it is a holistic framework that recognises that all stakeholders – commercial fishers, recreational fishers, wholesalers, retailers and consumers alike – need to become engaged, through a suite of awareness campaigns, dialogue sessions and workshops, in the planning and implementation of UAE fisheries management measures.

Abu Dhabi waters - demersal and pelagic species resource status

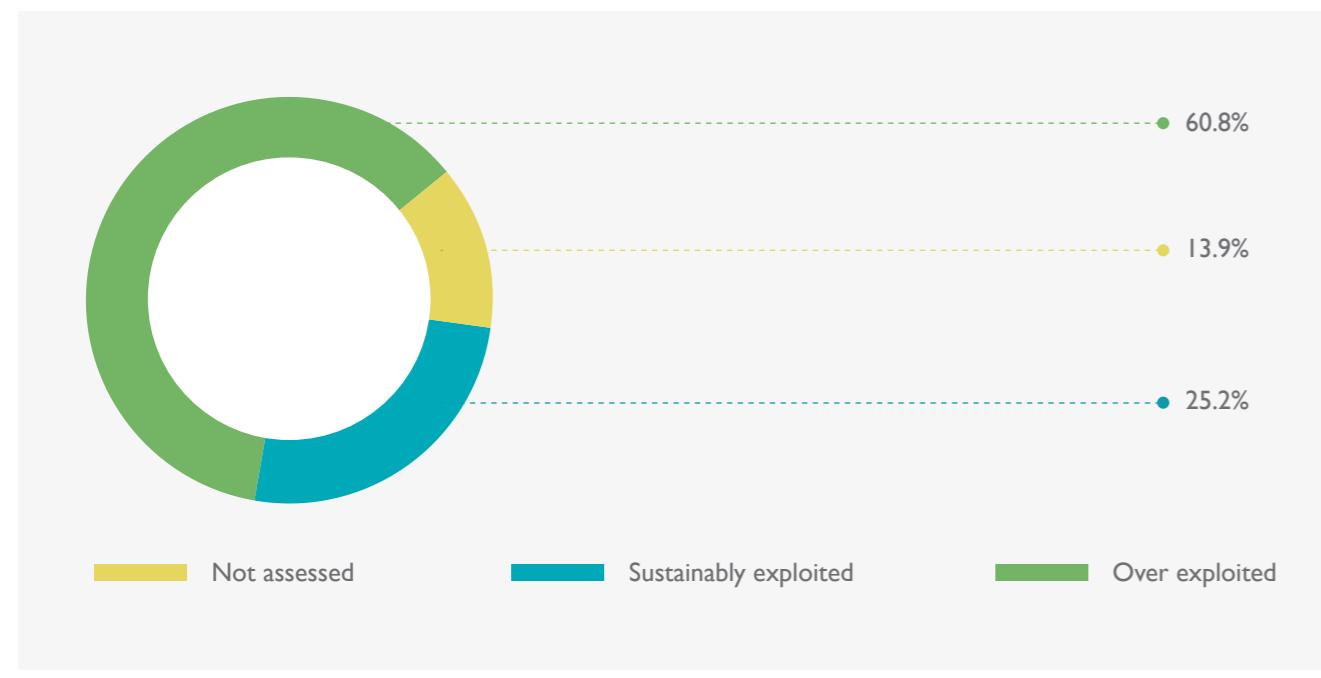


Figure 3 – Abu Dhabi over-exploited species, as per 2019.

This bulletin forms part of EAD's information outreach to stakeholders and the wider public and is a continuation of the Fisheries Statistical Bulletin series (2005-2018). The bulletin provides an overview of Abu Dhabi's Fisheries and Aquaculture in 2019, presented in three corresponding sections: Fisheries Statistics, Resources Indicators and Aquaculture Production.



Fisheries Statistics

Background

The EAD started collecting fisheries statistics for the Emirate of Abu Dhabi in 2001. After major upgrades in 2005 and in 2009, an online fisheries database application was developed to hold and produce national fisheries statistics for the UAE.



Figure 4 – The entrance to the Mushrif Mall Fish Market in Abu Dhabi.



Figure 5 – Recording the weight of landed Hamour (*Epinephelus coioides*) on Delma Island.

A final upgrade in 2019 established the UAE National Fisheries Information System (UAE-NFIS) having numerous fisheries management analytic routines (e.g., multi-variate ranking, spatial analysis of fishing grounds and CPUE standardisation). Strategic partners like Critical Infrastructure & Coastal Protection Authority (CICPA) and the Fishermen's Cooperative Societies in Abu Dhabi and Delma island (FCSs) provide essential data input vital to the compilation of Abu Dhabi fisheries statistics.

Description of the Fishery

Commercial fisheries in the Emirate of Abu Dhabi are artisanal with the fleet constituting of small-sized boats operating traditional fishing gears. There are two types of fishing vessels namely: tarads and lanshes.

Tarads are open fibreglass dories measuring 6-8 metres in length which are equipped with one to two outboard engines. The duration of a fishing trip is usually 6-8 hours with a maximum trip length of one day. The number of crew varies from 1-4 persons.

Lanshes are traditionally built wooden dhows ranging from 12-22 metres in length. They are decked and equipped with inboard diesel engines. Fish are stored whole, on ice, in insulated cool boxes. Fishing trips usually last between 3 and 5 days. The number of crew varies from 4-6 persons.

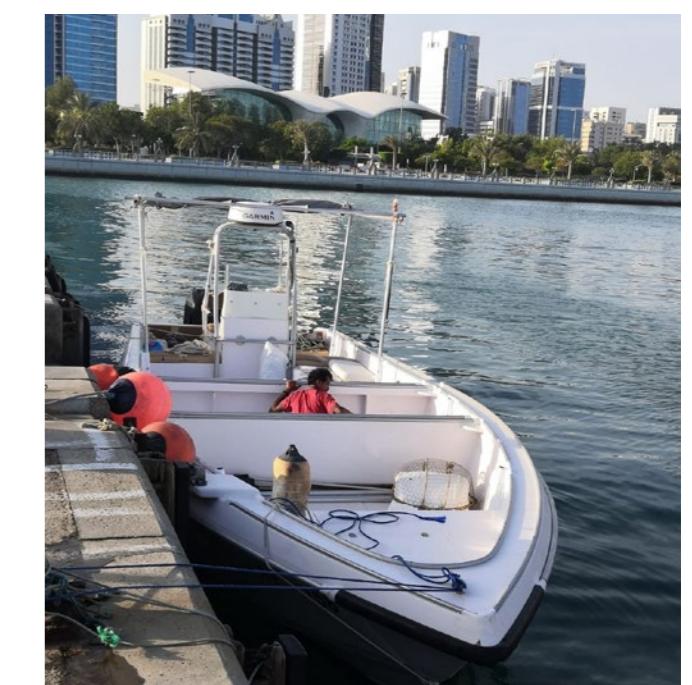


Figure 6 – Tarad moored at Abu Dhabi Free Port.



Figure 7 - Lansh loaded with gargoors leaving Abu Dhabi Free Port.



Figure 8 – Hadaq (hand line) ready for deployment.

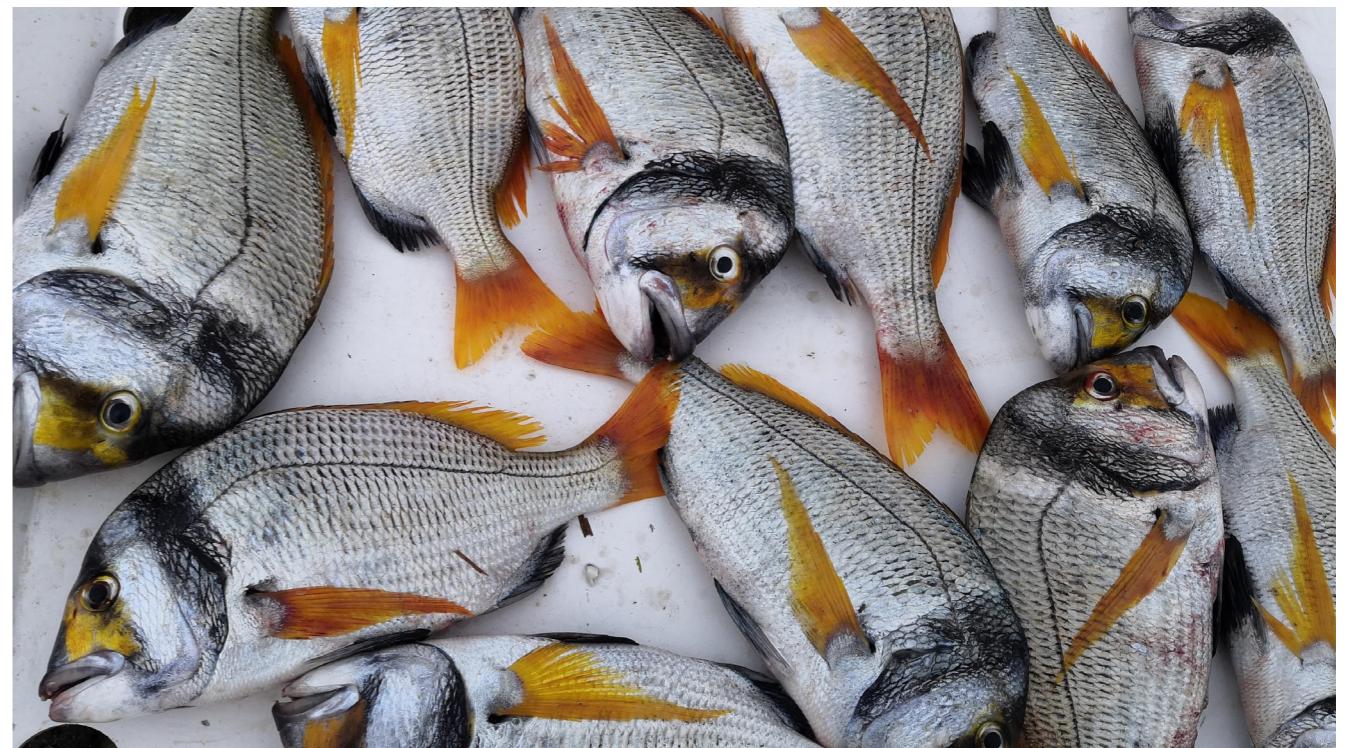
In addition to 509 tarads and 116 lanshes licensed to fish by the EAD, a considerable fleet of licensed fishing boats from other emirates also operates in Abu Dhabi waters under the condition that they follow Abu Dhabi's fishing gear regulations.

During the year 2019, two important commercial fishing methods were banned in the Emirate of Abu Dhabi, consistent with the overall objective in the National Framework for Sustainable Fisheries (2019-2030). The prohibited methods included the demersal Gargoor traps and the pelagic Ghazal nets. The implementation of these management measures, which were necessary to support the return of the fishery to sustainable levels, resulted in a huge drop in the landings of over-exploited species in the Emirate of Abu Dhabi.

The fisheries in the Emirate of Abu Dhabi are essentially artisanal using traditional fishing gears and technologies. The main fishing gear type used from a lansh targeting demersal species, is the now-defunct dome-shaped wired



Figure 9 – Setting Al Hadhra in Al Marfa.

Figure 10 – Faskar fish (*Acanthopagrus bifasciatus*) landed in Free Port.

Landing sites in the Emirate of Abu Dhabi

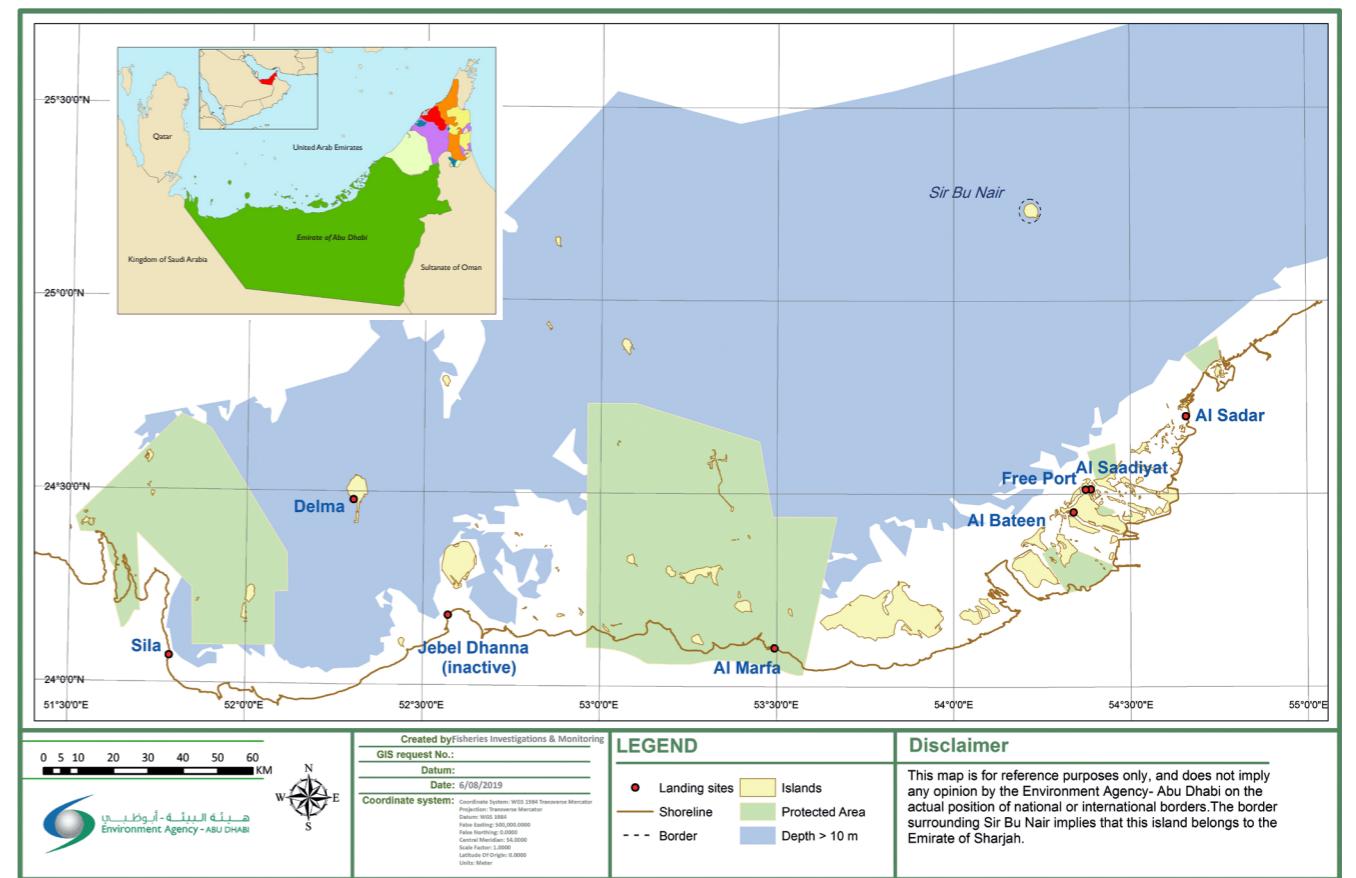


Figure 11 – Commercial fish landing sites in the Emirate of Abu Dhabi.

Landing Statistics in 2019¹

Total catch landed by site
in the Emirate of Abu Dhabi - 2019

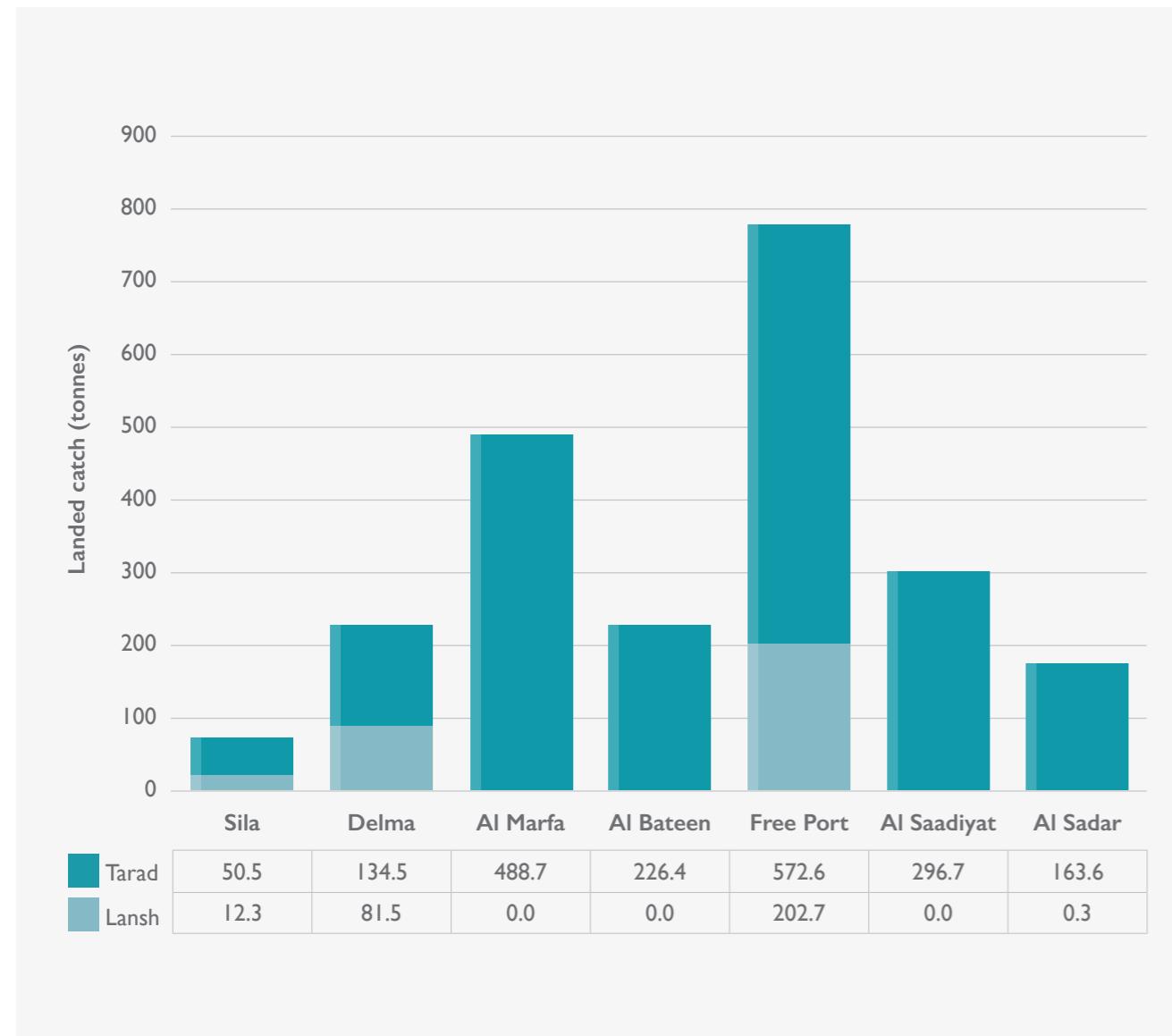


Figure 12 – Total catch by landing site and boat type.

Figure 12 depicts total catch by landing site and boat type in 2019.

The commercial catch landed in the Emirate of Abu Dhabi reached 2,230 tonnes in 2019, which is only 46% of the total catch realised in 2018 (4,892 tonnes). This is due to the ban on Gargoor and Ghazal fishing operations during the year 2019. Tarad landings comprised 87% of total production, against only 13% by lanh vessels. Free Port landing site accounted for 35% of the total production, followed by Al Marfa (22%).

¹ Note: Small differences in the totals of the statistics presented are due to rounding of numbers.

Total catch landed by month
categorised to boat type - 2019

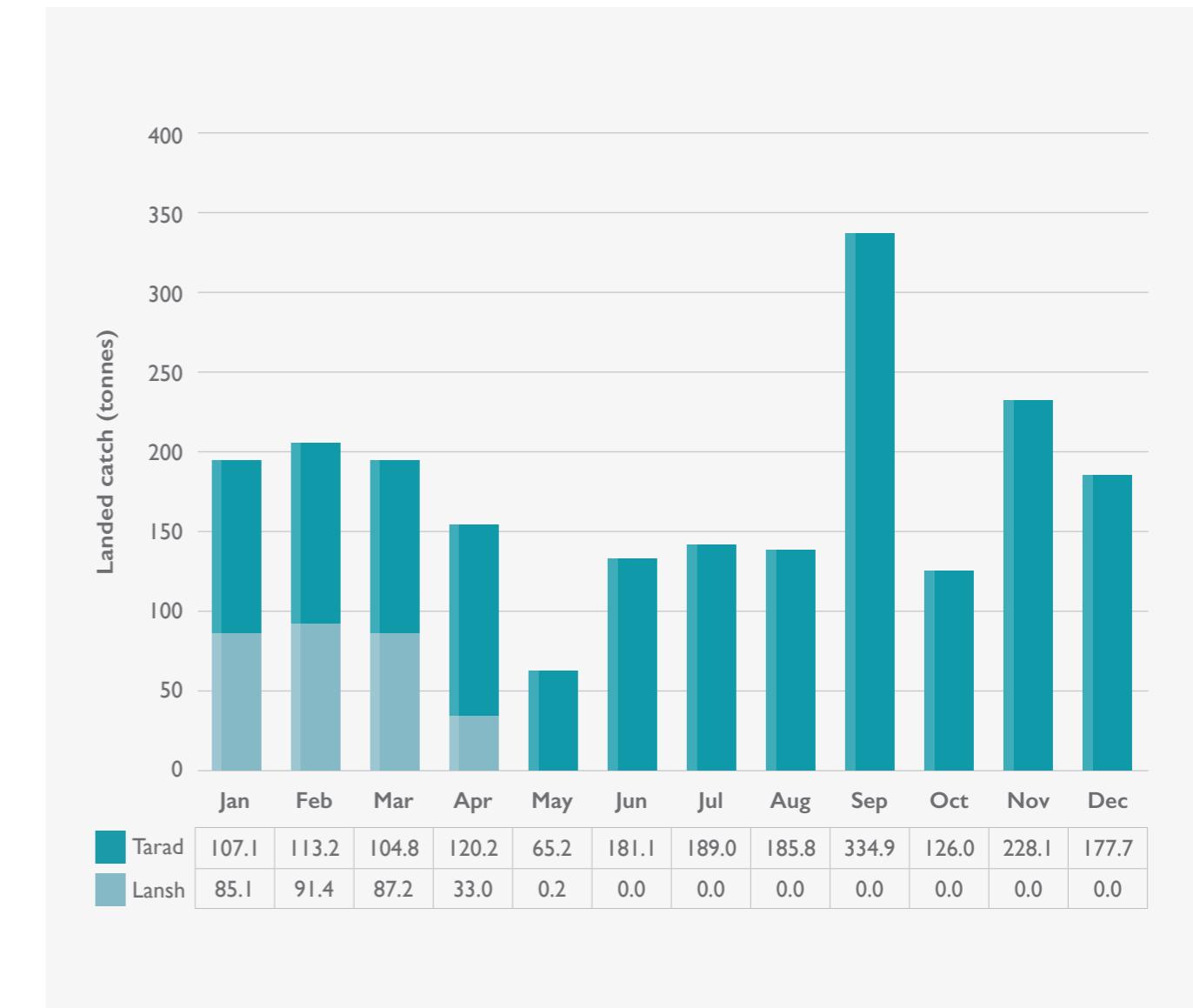


Figure 13 – Total catch by month and boat type.

Figure 13 summarises the total catch by month and boat type in 2019.

The drop in the landings of lanh vessels is due to the ban on Gargoor fishing effective per May 1, 2019. The peak in September by tarad fishing boats is related to huge Al Defara landings of Beyah Arabi (*Moolgarda seholi*) in Al Marfa and Naiser (*Lutjanus ehrenbergii*) landings by Al Hadhra.

Total catch of principal species families landed by boat/gear type combination - 2019

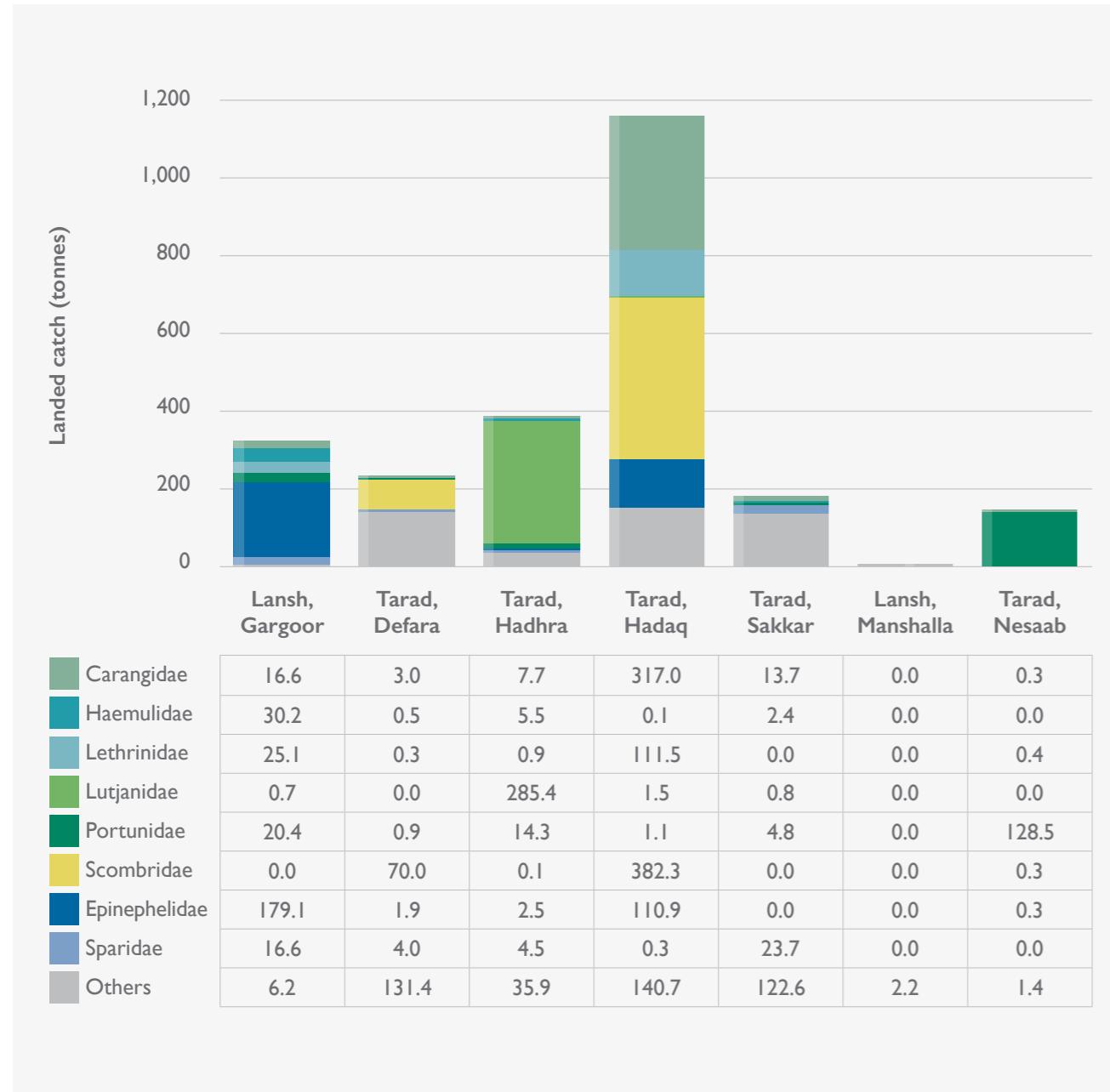


Figure 14 – Total catch of principal fish families landed by fishing method.

Figure 14 plots the total catch by fishing method.

Due to the (partial) absence of Gargoor and Ghazal fisheries, Tarad – Hadaq became the most important fishery in 2019, landing more than 1,065 tonnes or 48% of the total commercial production. Main species families landed are Scombridae / Kanaad (382 tonnes), Lethrinidae / Shaari (111 tonnes) and Epinephelidae / Hamour (111 tonnes).

Commercial Fishing Trips

Total number of fishing trips by site and boat type combination in the Emirate of Abu Dhabi - 2019

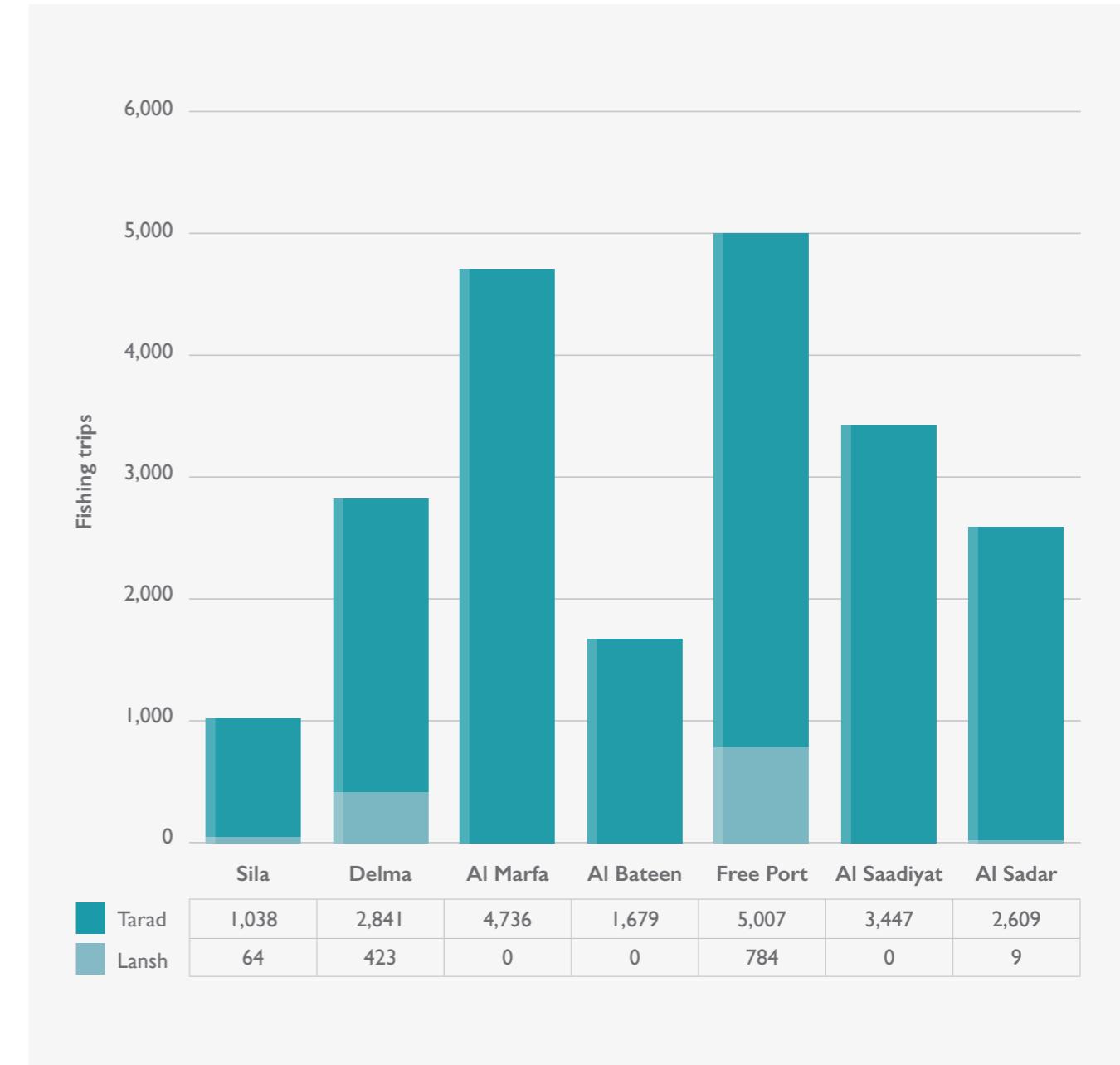


Figure 15 – Number of trips by landing site and boat type.

Figure 15 shows the number of commercial fishing trips conducted by boat type per landing site in 2019.

A total of 22,638 commercial fishing trips took place in 2019. Lansh vessels undertook a total of 1,281 fishing trips against 2,557 trips in 2018, which decrease is due to the Gargoor fishing ban effective per May 1, 2019. Tarad vessels undertook in 2019 a total of 21,357 fishing trips against 20,821 trips in 2018, which is an increase of 3%. This is remarkable, as the Tarad Ghazal fishery which accounted for 6,230 trips in 2018, was also banned in the year 2019. Most fishing trips occurred at Free Port landing site (26%), followed by Al Marfa (21%).

Commercial Wholesale Value

Wholesale value of principal species families by landing site in the Emirate of Abu Dhabi - 2019

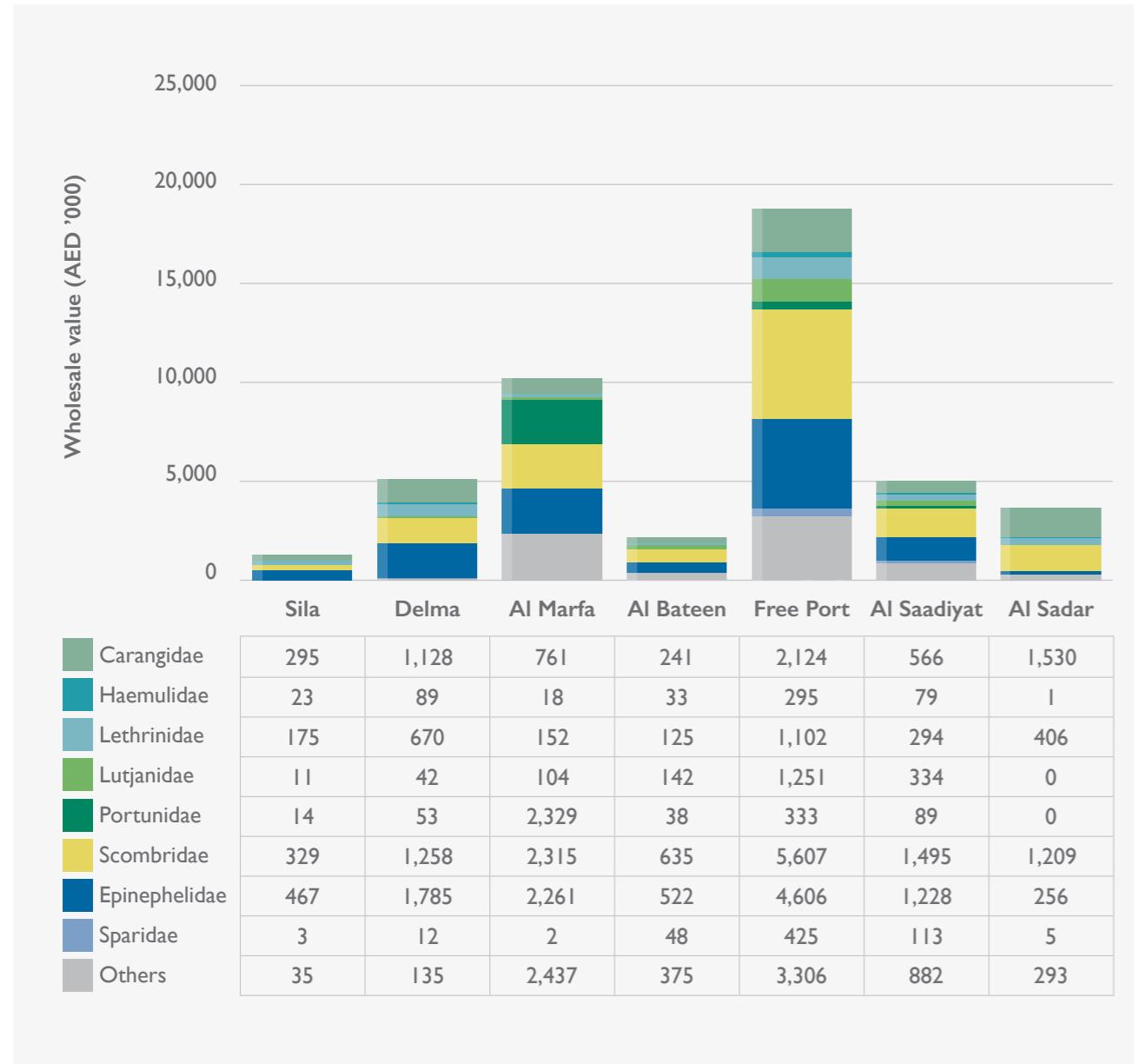


Figure 16 – Wholesale value of principal families by landing site.

Figure 16 shows the commercial wholesale value in the landings of different species groups by landing sites.

The total commercial value generated in 2019 is 46.9 Million AED (Figure 18), which represents only 39% of the value generated in 2018 (120.5 Million AED). The huge drop in the value attained in 2019 is due to the closure of two of Abu Dhabi's most productive fisheries. Compared to other landing ports, Free Port stratum yields the highest earnings with 19.0 million AED or 41% of the total wholesale value generated in Abu Dhabi Emirate, followed by 10.3 million AED in Al Marfa (22% of total wholesale value).

Wholesale value of principal species families by boat/gear type combination - 2019

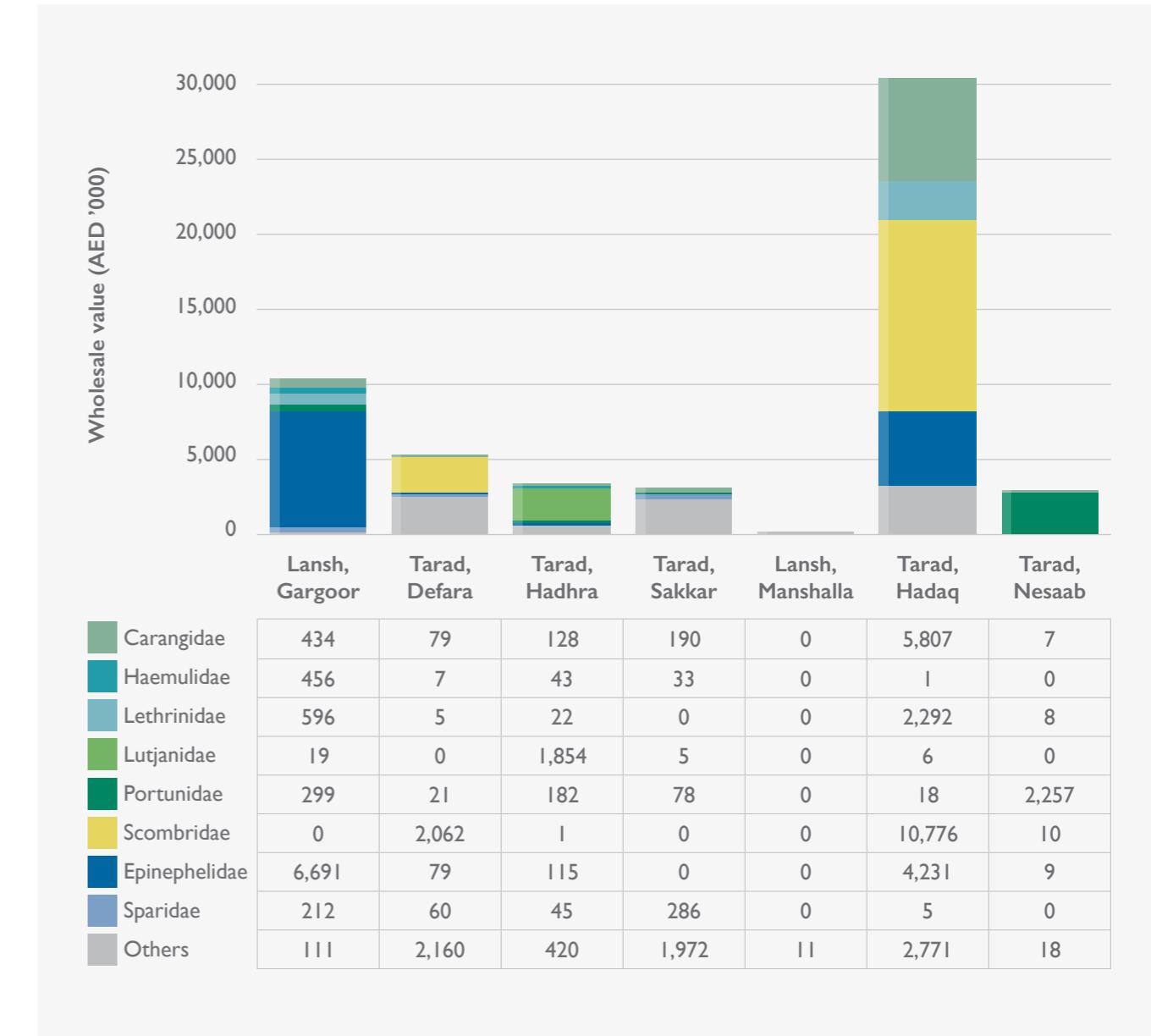


Figure 17 – Wholesale value of principal families by fishing method.

Figure 17 shows the commercial wholesale value in the landings of different species groups by fishing method.

Tarad - Hadaq fishing operations generated 26 million AED which equals 55% of the total commercial value. The Scombridae (Kanaad) and Epinephelidae (Hamour) families accounted for 27% and 24% of the total commercial wholesale value generated in the Emirate of Abu Dhabi, respectively.

Annual Trend - Commercial Fisheries

Trend of commercial fishing trips in Abu Dhabi Emirate over the period 2010 - 2019

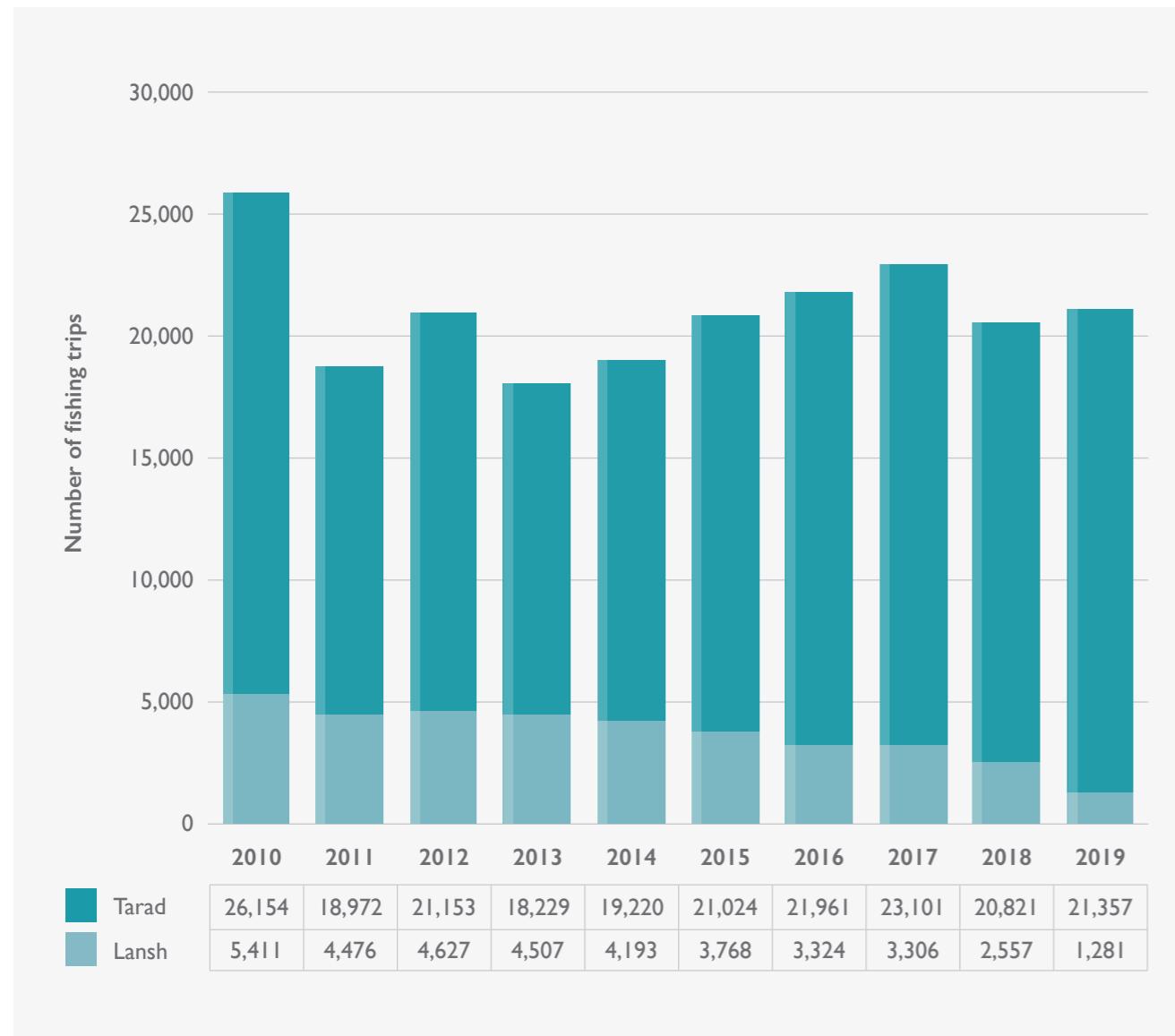


Figure 18 – Annual trend of commercial fishing trips in Abu Dhabi Emirate (2010-2019).

Figure 18 shows the trend in the number of commercial fishing trips over the period 2010 - 2019.

While the number of fishing trips by tarad vessels oscillates around 20,000 per year, the drop in the number of fishing trips by lansh vessels - from 5,411 in 2010 to 2,557 in 2018 - shows that gradually over time, Lansh - Gargoor fishery became economically less viable when compared to fisheries using tarad boats. The ban on using Gargoor traps in Abu Dhabi Emirate, effective per 1 May 2019, implicitly hastened the final departure of the traditional wooden Lansh vessel from Abu Dhabi fisheries.

Trend in commercial fisheries in Abu Dhabi Emirate, 2012 - 2019

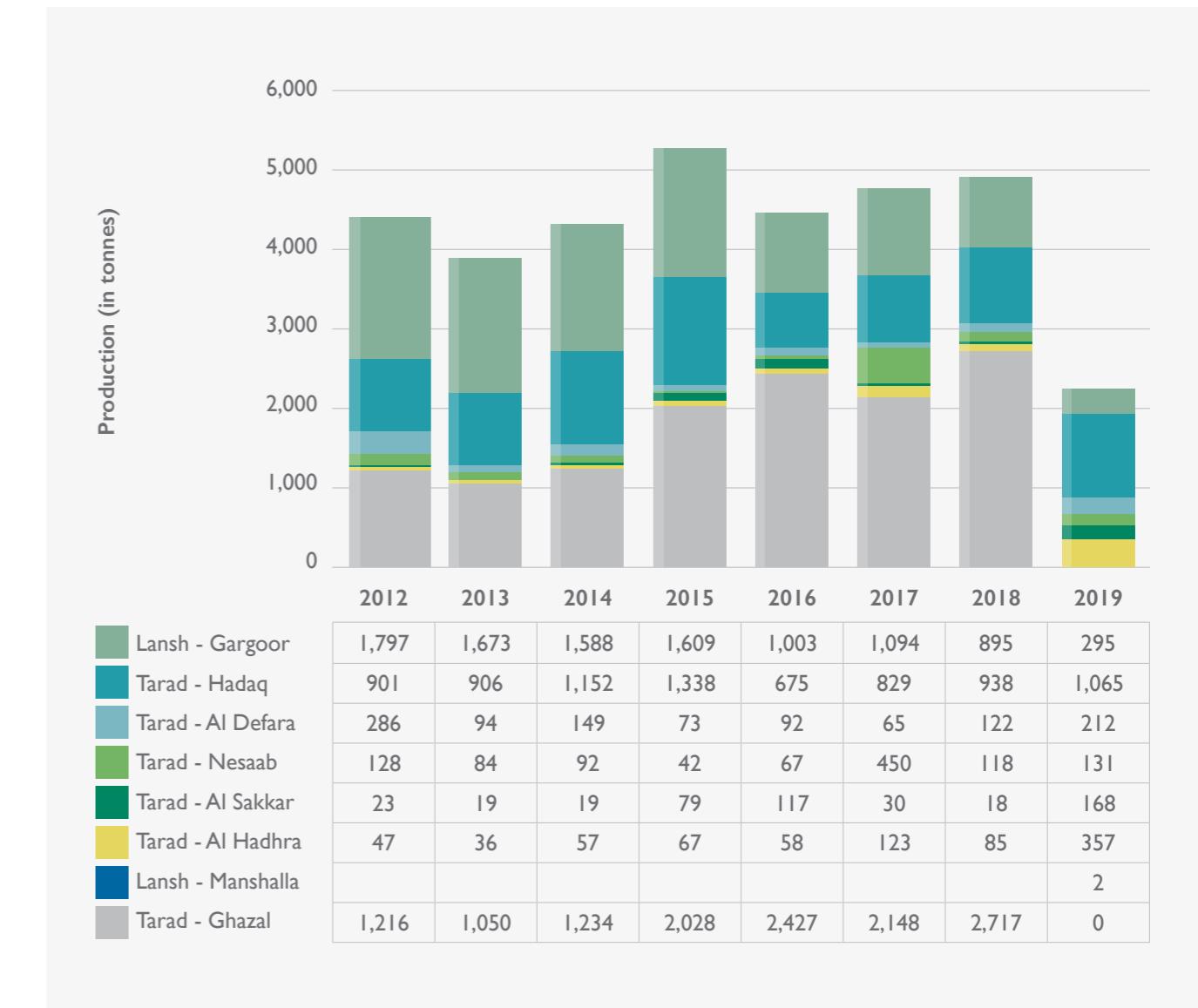


Figure 19 – Annual trend in production by commercial fisheries (2012-2019).

Figure 19 shows the trend in production by commercial fisheries over the period 2012 - 2019.

Ghazal net fisheries, normally the mainstay of Abu Dhabi's landings, dropped from 2,717 tonnes in 2018 to 0 tonnes due to the closure of this fishery in 2019. Gargoor trap fisheries, traditionally another important component of Abu Dhabi's landing, dropped from 895 tonnes in 2018 to only 295 tonnes in 2019. The landings of tarad fisheries (such as Hadaq, Al Defara, Al Sakkar, Al Hadhra and Nesaab) all intensified during the year 2019 and exceeded their 2018 production levels.

Trend in commercial production of principal species families landed in Abu Dhabi Emirate, 2010 - 2019

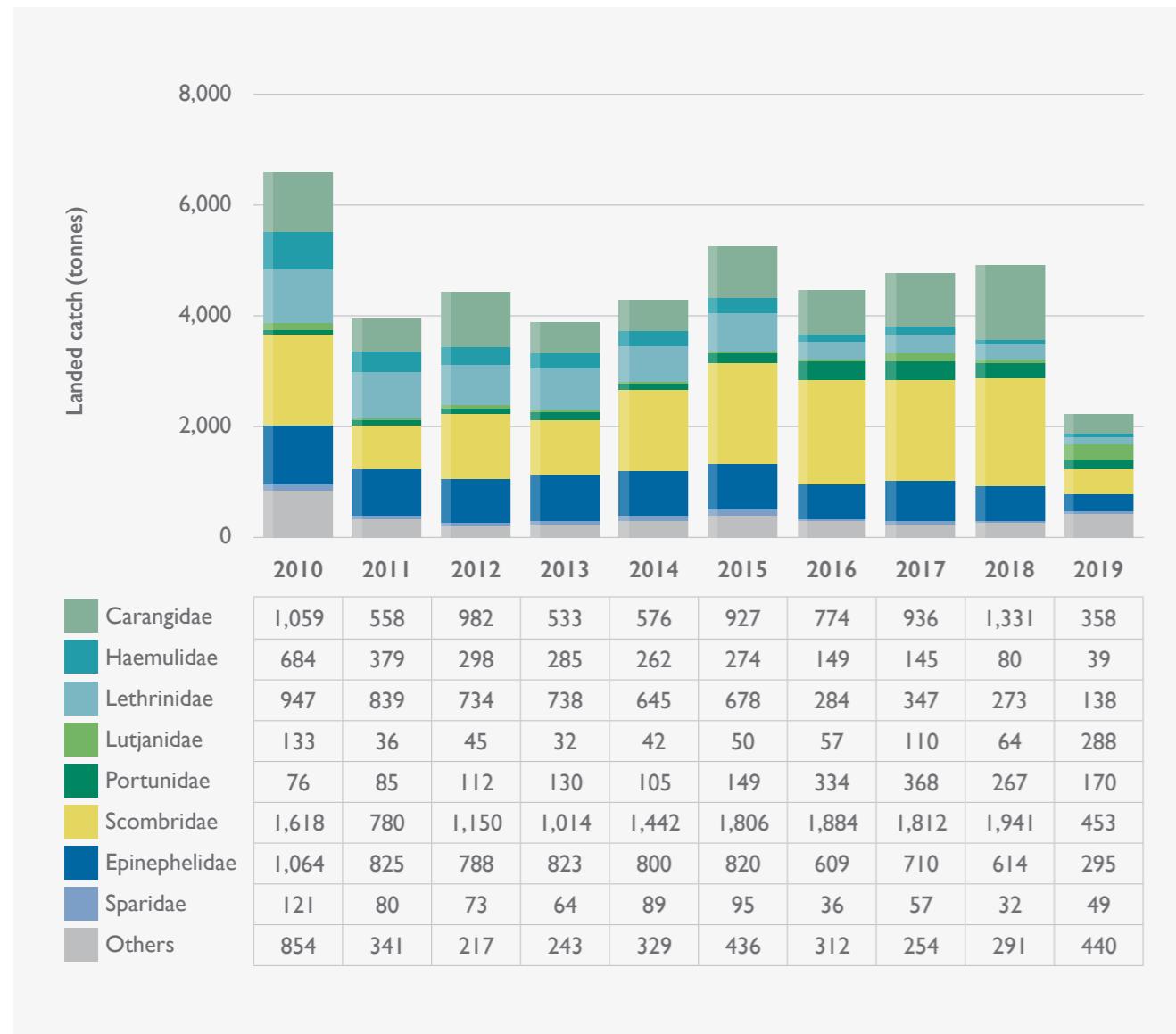


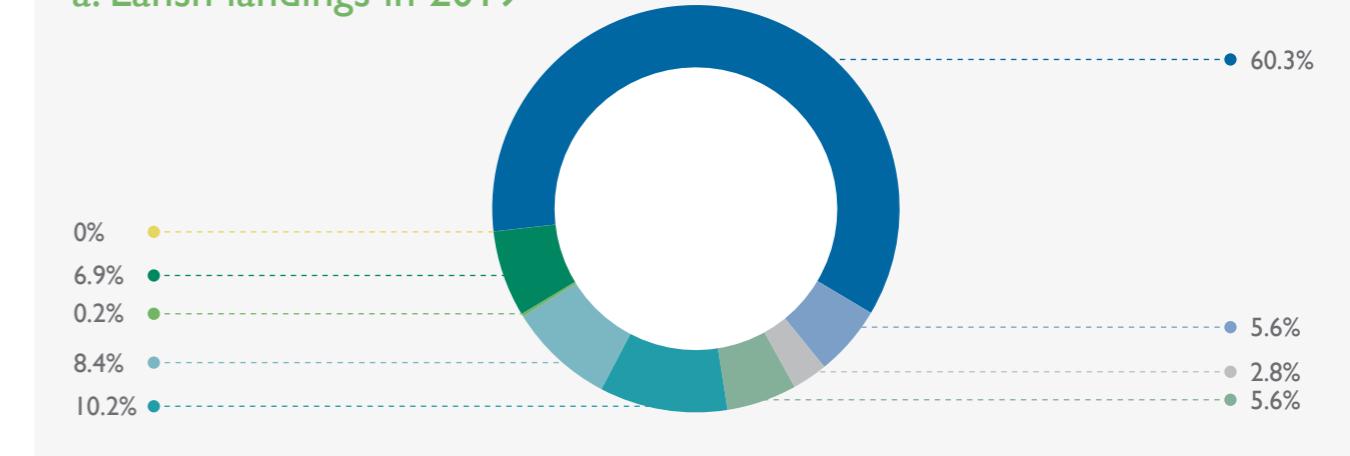
Figure 20 – Annual trend in commercial production by principal species groups (2010-2019).

Figure 20 shows the trend in annual commercial production by principal species group for the period 2010 - 2019.

As elaborated before, the drop in the total landings between 2019 and 2018 is due to the closure of the demersal Gargoor and pelagic Ghazal fisheries in the Emirate of Abu Dhabi. Especially the landing of Scombridae family, consisting of Kanaad (*Scomberomorus commerson*), Garfah (*Rastrelliger kanagurta*) and Tabban (*Auxis thazard*) among other species, dropped significantly from 1,941 tonnes in 2018 to only 453 tonnes in 2019. The production of the family Epinephelidae, consisting of Hamour (*Epinephelus coioides*), Semman (*Epinephelus areolatus*) and Eshnenuh (*Cephalopholis hemistictos*) among other species, fell also to its lowest level (295 tonnes in 2019) since the recordings of Abu Dhabi fisheries statistics started in 2001.

Species Composition

a. Lansh landings in 2019



b. Tarad landings in 2019

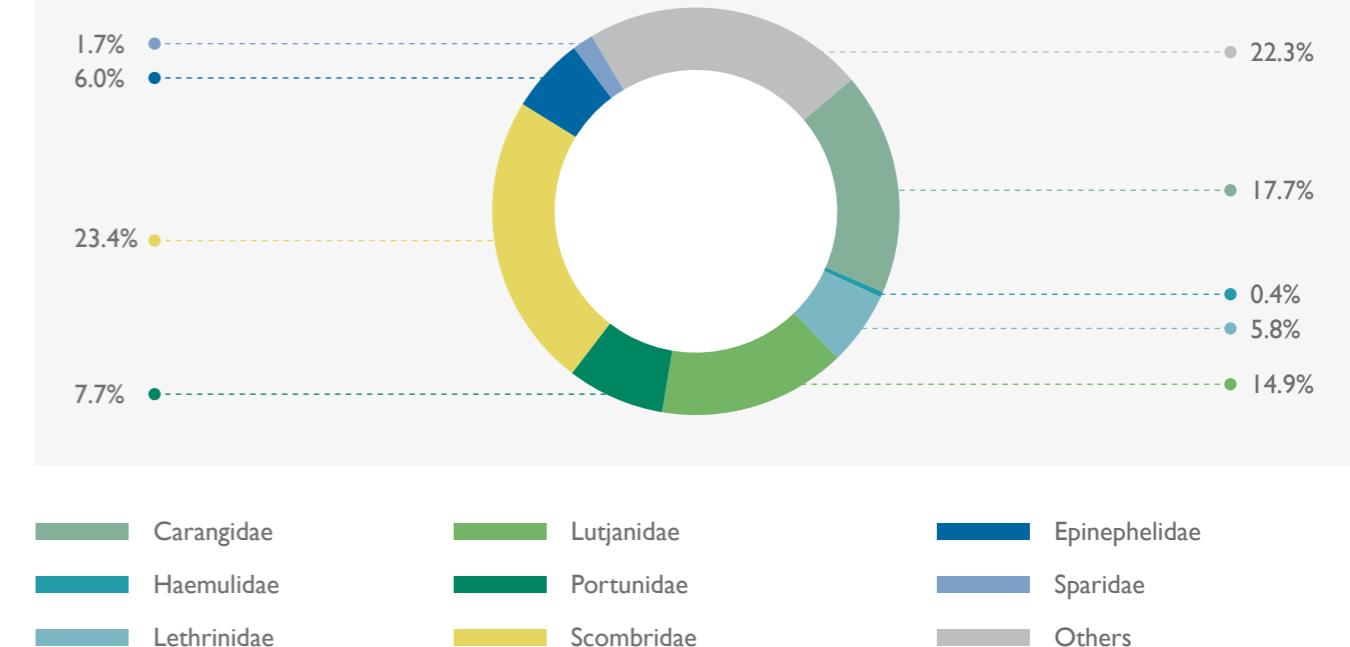


Figure 21 – Species composition of landings by a Lansh (a) and Tarad (b).

Figure 21 shows the species group composition of landings realised by lansh and tarad vessels.

The bulk of fish landed by lansh vessels remained Epinephelidae (Hamour) with 60% of the total catch, followed by Haemulidae (Farsh) and Lethrinidae (Shaari) with 10% and 8%, respectively. Scombridae (Kanaad) was the main component in tarad landings attaining 23% of total tarad production followed by Others and Lethrinidae (Shaari) with 22% and 15%, respectively.

Species Prices

Table I shows average wholesale prices (AED/Kg) attained for the year 2019

Species	1	2	3	4	5	6	7	8	9	10	11	12	2019
Aifah <i>Chanos chanos</i> (Milkfish)	19.0	15.5	25.0		6.1	11.1	7.3	10.3	11.4	12.0	13.6	8.0	10.7
Anfooz <i>Pomacanthus maculosus</i> (Yellow bar angelfish)				5.0									5.0
Aqalah <i>Lutjanus fulviflamma</i> (Black spot snapper)				5.4	2.8	4.4	6.7	6.6	4.0				4.8
Badah <i>Gerres longirostris</i> (Longtail siver biddy)	18.8	9.6	15.3			13.3	10.5	10.9	13.9	10.8	10.3	11.3	12.4
Bassar <i>Scomberoides tol</i> (Needlescaled queenfish)	8.0	7.6	17.0	7.1	4.4	4.4	6.0	7.6	6.2	7.9	3.0	5.5	6.2
Beyah Arabi <i>Moolgarda sebela</i> (Blue spot mullet)	22.0	15.0		27.1	17.4	32.3	21.3	18.3	22.0	31.5		31.7	22.7
Dhil'e <i>Scomberoides commersonnianus</i> (Talang queenfish)	6.0	4.0	6.0	13.5	4.5	5.5	4.0	4.8	7.2	4.2	4.0	4.0	5.3
Durduman Atule mate (Yellow tail scad)	15.3	7.1	9.8	12.8	6.4	12.9	7.5		12.3	13.2	6.8		9.9
Farsh <i>Diagramma pictum</i> (Painted sweetlips)	14.9	18.6	17.9	14.9	12.4	15.0							17.0
Faskar <i>Acanthopagrus bifasciatus</i> (Two bar seabream)	15.0	13.0	9.6	6.9	9.0	4.0	6.0	6.0	7.0				11.9
Garfah <i>Rastrelliger kanagurta</i> (Indian mackerel)	4.0				12.5								4.4
Gufdar <i>Caranx ignobilis</i> (Giant trevally)	35.6	29.7	36.1	26.0	6.3	19.4	17.2	30.0	37.0	17.4			26.9
Habbar <i>Sepia pharaonis</i> (Pharaoh cuttlefish)				33.0	19.4	13.9	14.6	12.0		10.0			16.0
Halwayoh <i>Parastromateus niger</i> (Black pomfret)													15.3
Hamam <i>Seriolina nigrofasciata</i> (Blackbanded trevally)		13.0		10.0									11.9
Hamour <i>Epinephelus coioides</i> (Orange spotted grouper)	39.7	36.0	38.3	32.2	29.3	42.8	47.8	45.8	47.8	41.4	44.7	29.5	39.1
Hamra <i>Lutjanus malabaricus</i> (Malabar blood snapper)	27.2												27.2
Haqool Belonidae (Needlefish species)	6.0				3.3	5.7	4.5	4.0	3.2	25.5	21.6	19.0	19.0
Hilali <i>Plectorhinchus gaterinus</i> (Blackspotted rubberlip)	15.1	11.7	3.0	15.0									11.7
Imad <i>Platax teira</i> (Longfin batfish)	3.6							5.0					4.0
Jarjoor <i>Carcharhinidae</i> (Shark species)	10.6	6.5					8.0	30.6					19.1
Jedd <i>Sphyraena jello</i> (Pickhandle barracuda)	26.9	24.1	20.7	19.7	8.3	26.1	20.8	18.6	11.5	13.1	13.5	12.8	17.4
Jesh Um Al Hala <i>Carangoides bajad</i> (Orange spotted trevally)	19.6	19.3	25.3	24.4	21.0	20.1	19.3	22.2	21.9	21.9	17.6	21.5	21.3
Jib <i>Seriola dumerili</i> (Greater amberjack)	11.5	22.2		60.0		12.5		12.7					13.7
Kanaad <i>Scomberomorus commerson</i> (Kingfish)	27.6	30.2	25.5	31.9	28.3	26.6	32.0	39.8	34.8	24.8	23.3	20.0	28.3
Khan <i>Netuma thalassina</i> (Giant catfish)	13.3	4.9	5.4	5.2	6.7	1.0	2.0	5.3	6.0		1.1	1.0	5.8
Kofar <i>Argyrops spinifer</i> (King soldier bream)	28.1	18.1	23.5	15.6	21.0								22.3
Korsh Shiaab du Al Atraf Aswad <i>Carcharhinus melanopterus</i> (Blacktip Reef shark)							23.4	36.3	8.3	15.4			29.8
Mekhlot Mixed species (Mixed species)	15.0		30.5	8.8	3.9	14.1	14.4	7.5	12.5			29.7	13.9
Naiser <i>Lutjanus ehrenbergii</i> (Ehrenberg's snapper)				5.8	4.6	4.1	7.9	6.5	7.3				6.5
Naqroor <i>Pomadasys argenteus</i> (Silver grunt)					9.9	6.0	12.9	20.0	10.4		10.7		11.5
Qabit <i>Rhabdosargus sarba</i> (Goldlined seabream)	8.3	11.3	8.0	10.7	8.0	11.2	12.1	10.4	12.8	12.1	8.0	6.0	10.9
Qabqob <i>bunni Charybdis natator</i> (Ridged swimming crab)	25.0	25.0		8.0									24.3
Qabqob <i>Portunus pelagicus</i> (Blue swimming crab)	15.1	16.4	18.9	17.6	12.1	11.9	15.6	9.4	11.6	25.5	17.6	16.4	16.8
Safi Arabi <i>Siganus canaliculatus</i> (White-spotted spinefoot)	27.3	34.4			3.1	14.1	19.9	26.1	15.5	29.4	18.8	19.4	19.8
Semanan <i>Epinephelus areolatus</i> (Areolate grouper)				24.4									24.4
Shaam <i>Acanthopagrus latus</i> (Yellowfin seabream)	16.2	16.6	15.3	15.8	6.0	14.5	15.2	20.4	16.6	15.7			15.9
Shaari Eshkheli <i>Lethrinus lentjan</i> (Pink ear emperor)	26.0	26.8	27.3	23.9	15.0								25.8
Shaari <i>Lethrinus nebulosus</i> (Spangled emperor)	23.6	24.7			18.7	17.9	19.4	26.4	26.8	23.4	22.1	16.5	21.3
Sikkil <i>Rachycentron canadum</i> (Cobia)	18.8	31.9	25.7	28.9	29.4	33.0	20.0		25.0	14.0			25.8
Sils <i>Rhynchorhamphus georgii</i> (George's halfbeak)	6.3	6.6	6.2			17.9				6.4	6.4	6.4	6.5
Souli <i>Lethrinus microdon</i> (Small tooth emperor)	10.8	7.6	5.9	4.0	4.0	9.0	12.5	21.0	4.0	8.3	8.8	7.5	8.9
Tabban <i>Auxis thazard</i> (Frigate tuna)	15.0	23.6			17.9	21.6							18.9
Umm Dhrais <i>Lutjanus indicus</i> (Indian snapper)	27.2			20.0									26.6
Yanam <i>Plectorhinchus sordidus</i> (Sordid sweetlips)	11.9	5.1	10.7	7.3	6.8	4.8	4.7	3.9	3.8				8.8
Yemah <i>Lethrinus borbonicus</i> (Snubnose emperor)	4.0	7.0	8.0	5.8						6.2	21.6		6.8
Zuraidi <i>Gnathanodon speciosus</i> (Golden trevally)	25.3	24.8	26.2	29.0	13.4	24.1	41.3	27.8	30.0	30.0	21.6	21.8	27.0
TOTALS	25.3	23.5	26.2	21.9	16.4	17.8	21.7	24.7	20.6	24.2	21.1	18.9	22.0

Table I – Species prices in AED per Kilogram.

Resources Indicators

Background

Since 2001, the EAD conducts comprehensive fisheries research to assess the resource status of 28 commercially important species in the Emirate of Abu Dhabi. Table I shows the species biology and fishery characteristics (e.g., spawning season and fishery mortality) and the resource status of the assessed species, which makes up 86% of the total volume commercially landed in 2019.

The UAE National Framework for Sustainable Fisheries (2019-2030) measures the achievement of its overall objective 'Sustainable fisheries for the UAE by 2030' through two Key Performance Indicators:

1. Sustainable Exploitation Index (SEI) increase from 8.4% in 2017 to 70% in 2030; and
2. Overexploited fish stocks rebuilt to minimum sustainable thresholds, with mean relative adult stock size (Mean SBR) for three key species increased from 6.6% average in 2017 to 30% in 2030.



Figure 22 –Taking length frequency measurements of Hamour (*Epinephelus coioides*) in the fish market of Free Port.



Table 2 shows population parameters of commercially important species in Abu Dhabi waters - Updated as per March 2020

#	Species (Latin name)	Arabic name	Method	Z	F	M	Flim	F/Flim	SBR	Spawning season	2019 landings (mt)	Status ¹
1	<i>Epinephelus coioides</i>	Hamour	Age	0.69	0.50	0.19	0.13	3.93	7.1	Apr-May	419	2019
2	<i>Lethrinus nebulosus</i>	Shaari	Age	0.55	0.35	0.20	0.13	2.61	11.0	Apr - May	187	2018
3	<i>Diagramma pictum</i>	Farsh	Age	0.64	0.51	0.13	0.09	5.86	6.2	Apr - May	22	2018
4	<i>Scomberomorus commerson</i>	Kanaad	Length	0.73	0.47	0.26	0.17	2.71	17.3	Apr - Aug	501	2018
5	<i>Gnathanodon speciosus</i>	Zuraidi	Length	1.08	0.73	0.35	0.23	3.15	8.8	Apr- May	21	2014
6	<i>Rhabdosargus sarba</i>	Qabit	Age	0.77	0.51	0.26	0.17	4.42	18.8	Jan-Jun	32	2018
7	<i>Siganus canaliculatus</i>	Safi Arabi	Age	1.34	0.80	0.54	0.36	2.58	12.6	Apr- Jul.	38	2019
8	<i>Scomberoides commersonianus</i>	Dhil'e	Length	0.51	0.26	0.25	0.17	1.55	19.4	Mar - Jun	24	2013
9	<i>Argyrops spinifer</i>	Kofar	Age	1.07	0.68	0.38	0.26	2.67	14.6	Jan - Apr	2	2014
10	<i>Cephalopholis hemistictos</i>	Eshnenuh	Age	0.38	0.17	0.21	0.14	1.21	17.8	Jul - Nov	0	2013
11	<i>Lutjanus argentimaculatus</i>	Marjaan	Age	0.21	0.10	0.11	0.07	1.36	17.3	Sep - Oct	0	2013
12	<i>Carangoides bajad</i>	Jesh Um Al Hala	Length	1.05	0.62	0.43	0.29	2.13	22.6	May - Sep	334	2014
13	<i>Moolgarda sehelii</i>	Beyah Arabi	Length	0.73	0.26	0.47	0.31	0.73	31.9	Feb - Apr	78	2019
14	<i>Lethrinus borbonicus</i>	Yemah	Age	0.97	0.50	0.47	0.31	1.59	30.6	Mar-Jun	2	2016
15	<i>Lutjanus ehrenbergii</i>	Naiser	Age	0.61	0.26	0.35	0.23	1.13	35.8	Mar-Jun	283	2018
16	<i>Lethrinus microdon</i>	Souli	Age	0.68	0.21	0.47	0.31	0.67	63.6	Jun.-Nov	17	2016
17	<i>Atule mate</i>	Durduman	Length	1.44	0.33	1.11	0.74	0.44	78.0	Apr - May	13	2011
18	<i>Acanthopagrus bifasciatus</i>	Faskar	Age	0.25	0.05	0.20	0.13	0.38	70.4	Jan- Apr	5	2014
19	<i>Gerres longirostris</i>	Badah	Age	0.72	0.30	0.42	0.28	1.07	40.0	Mar- Jun.	89	2015
20	<i>Lethrinus lentjan</i>	Shaari Esh-kheli	Age	0.58	0.29	0.29	0.15	1.49	87.5	Apr- Jun	5	2017
21	<i>Acanthopagrus latus</i>	Shaam	Age	0.46	0.16	0.30	0.20	0.50	70.0	Jan - Mar	10	2018
22	<i>Lutjanus fulviflamma</i>	Aqalah	Age	0.40	0.11	0.29	0.19	0.57	64.8	Apr- Jul	4	2014
23	<i>Plectorhinchus gaterinus</i>	Hilali	Age	0.28	0.08	0.20	0.13	0.60	56.9	Apr - May	0	2010
24	<i>Plectorhinchus sordidus</i>	Yanam	Age	0.41	0.11	0.30	0.20	0.75	69.6	Mar-May	10	2018
25	<i>Pomacanthus maculosus</i>	Anfooz	Age	0.14	0.02	0.12	0.08	0.50	69.1	Sep-Oct	0	2017
26	<i>Scolopsis taeniatus</i>	Ebzimi	Age	1.93	1.08	0.85	0.57	1.90	77.9	Mar-Apr, Sep-Oct	0	2016
27	<i>Sphyraena jello</i>	Jedd	Length	0.40	0.05	0.35	0.23	0.21	81.0	Apr - Sep	125	2011
28	<i>Netuma thalassina</i>	Khan	Age	0.27	0.06	0.21	0.14	0.43	56.5	May - Jun	12	2011

Note: Z:Total Mortality, F: Fishing Mortality and M: Natural Mortality, Flim is the targeted limit Fishing Mortality, F/Flim is exploitation ratio and SBR is mean relative adult stock size.

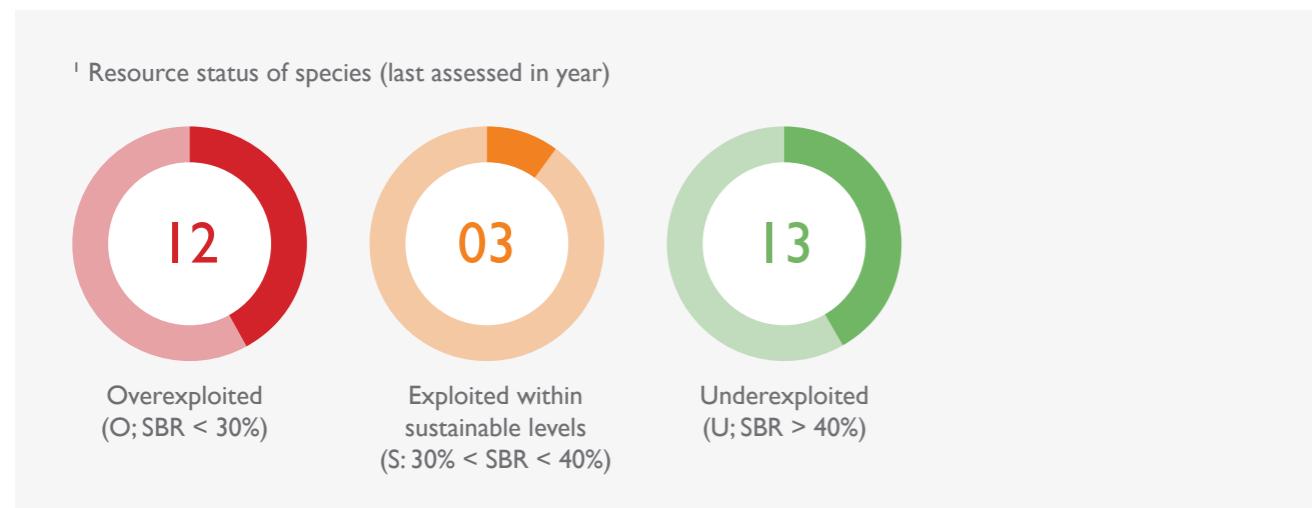


Table 2 – The key species status summary, updated per March 2020.

KPI - Sustainable Exploitation Index (SEI)

The Sustainable Exploitation Index (SEI) is a Key Performance Indicator (KPI) that describes the proportion of the total assessed catch landed that consists of sustainably exploited species, estimated each year, and defined as:

$$\text{SEI} = (\text{Total sustainable catch}/\text{Total assessed catch}) \times 100$$

Total sustainable catch is the annual landed catch (tonnes) of species for which stock assessments have been undertaken and classified as either sustainable or under exploited.

Total assessed catch is the total annual landed catch (tonnes) of all species for which stock assessments have been undertaken.

The SEI threshold value is set at 70%, while the target value is set at 100%. The Agency's data revealed a marked increase in a short period of time in the application of fishing measures and procedures, with the index rising from 5.7% in 2018 to 29.3% at the end of 2019.

This increase is high and unprecedented in improvement. This increase is due to the decision to ban two main fishing gears (Gargours & Ghazal), which specifically target fish species that are assessed as being overexploited, such as Farsh, Shaari, Hamour and Kanad. The increase indicates that the administrative actions implemented on fisheries are in the right direction for the recovery of fish stocks by 2030.

Sustainable exploitation (2010 - 2019)

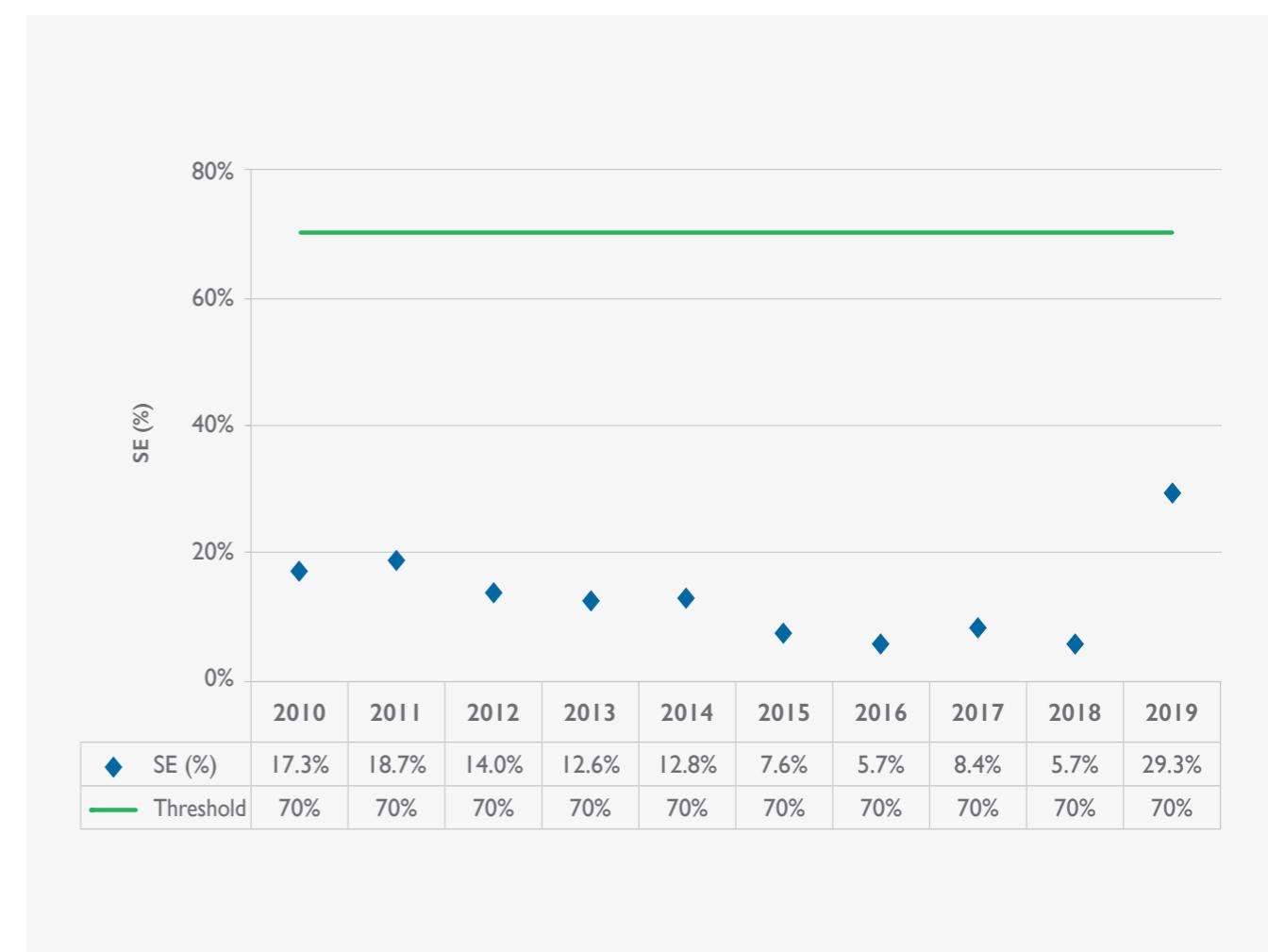


Figure 23 - Sustainable Exploitation Index (SEI) from 2010 to 2019.

KPI - Mean Relative Adult Stock Size (Mean SBR)

The mean relative adult stock size for 3 key species (Mean SBR) is a proxy for the adult stock size used to evaluate the status of fisheries resources. It is routinely calculated every two years for the three most important commercially exploited species in the demersal fishery of Abu Dhabi; *Epinephelus coioides* (Hamour), *Lethrinus nebulosus* (Shaari), and *Diagramma pictum* (Farsh). The indicator is derived from population models with input parameters that relate to population dynamics (e.g., growth rate and the age at maturity) and fishery characteristics (e.g., the age at first capture and fishing mortality rate), as follows:

$$SBR = \sum_{t=0}^{t_{max}} N_t W_t G_t$$

Where:

SBR = Relative spawner biomass per recruit

t_{max} = the maximum observed age in the fishery

N_t = the number of fish surviving to age t

W_t = the mean weight at age t

G_t = the fraction of mature fish at age t

Meta analyses of the relationships between stock sizes and recruitment have produced biological reference points against which the SBR is compared in order to infer the status of the population (if it is over-exploited or not).

The target reference point² is a Mean SBR of 40% and the limit threshold reference point is a Mean SBR of 30%, below which threshold management should intervene in order to prevent stock declines. The mean SBR indicator for 2019 increased from 7.6% in 2018 to 8.1% in 2019 and remains well below the critical endangered level of 10%, below which level stocks are considered severely over-exploited (Figure 24 & Table 3).

²The Spawner Biomass per Recruit (SBR) is a proxy for the adult fish stock size that directly reflects the resource status when compared to target (40%) and limit (30%) biological reference points that are recognised as international fisheries management conventions. This is a commonly used international convention for fisheries management. Meta analyses indicate that ground fish (demersal) stocks can be exploited sustainably without normal reproductive processes being impaired if the adult stock size is reduced to 40% of its virgin, unexploited size (SBR = 40%).

Spawner biomass per recruit time series

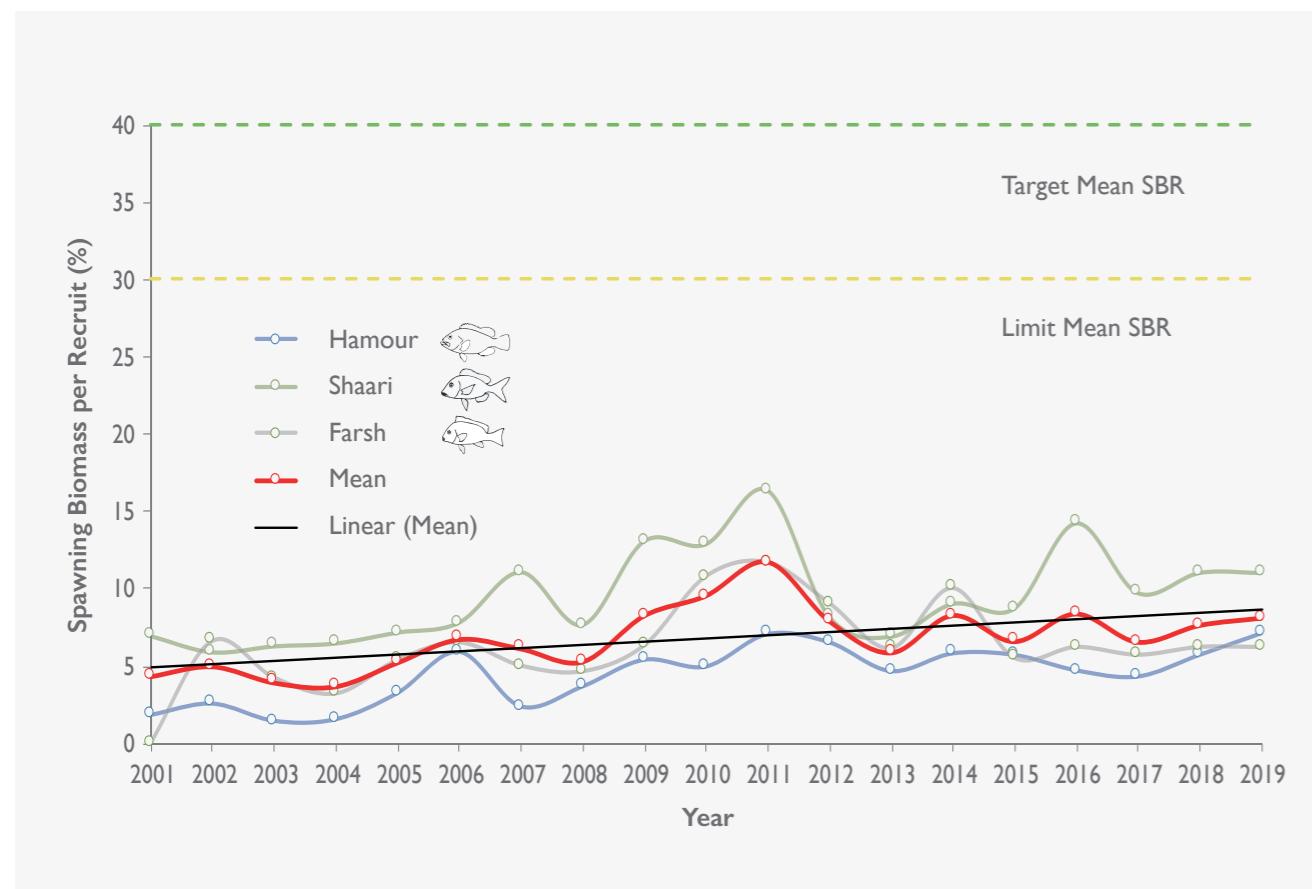


Figure 24 – Mean relative adult stock size (Mean SBR) from 2001 to 2019.

Table 3 shows spawner biomass per recruit time series

Year	Spawner Biomass per Recruit (SBR)%					
	Limit	Target	Hamour	Shaari	Farsh	Mean
2001	30	40	1.8	6.9	-	4.4
2002	30	40	2.5	5.9	6.6	5.0
2003	30	40	1.4	6.3	4.2	4.0
2004	30	40	1.5	6.4	3.2	3.7
2005	30	40	3.2	7.1	5.4	5.2
2006	30	40	5.9	7.8	6.5	6.7
2007	30	40	2.4	11.0	5.0	6.1
2008	30	40	3.7	7.6	4.6	5.3
2009	30	40	5.4	13.0	6.3	8.2
2010	30	40	4.9	12.8	10.8	9.5
2011	30	40	7.1	16.3	11.7	11.7
2012	30	40	6.5	8.2	9.0	7.9
2013	30	40	4.7	6.9	6.1	5.9
2014	30	40	5.8	9.0	10.0	8.3
2015	30	40	5.7	8.7	5.5	6.6
2016	30	40	4.7	14.2	6.2	8.4
2017	30	40	4.3	9.7	5.7	6.6
2018	30	40	5.7	11.0	6.2	7.6
2019	30	40	7.1	11.0	6.2	8.1

Table 3 – Spawner Biomass per Recruit (SBR) time series.



Aquaculture Production

In 2019, there were five permitted aquaculture operations in the Emirate of Abu Dhabi contributing to a total aquaculture production of 527 tonnes of seafood with a farm gate value of approximately AED 18 million. Hamour (*Epinephelus coioides*) and Indian white prawns (*Penaeus indicus*) dominated production.

Aquaculture Landscape of Abu Dhabi

According to 2019 data, five licensed aquaculture operations are within the Emirate of Abu Dhabi (Figure 25), four of which are commercial facilities and one is a research facility. Among these, there are two large-scale farms; one producing Indian white prawns in ponds near Abu Dhabi city and the other is producing Hamour in a high-tech re-circulating system in Al Wathba. There are also two small-scale aquaponics farms producing Nile tilapia (*Oreochromis niloticus*) with vegetables in a symbiotic environment in Bani Yas and Al Faya. In addition, a small-scale research facility produces Nile tilapia in Masdar city.

Permitted aquaculture farms in Abu Dhabi 2019



Figure 25 – Locations of permitted aquaculture farms in Abu Dhabi.

Total Aquaculture Production and Value in 2019

Figure 26 shows the volume of species produced, where Hamour was the principal species produced, accounting for approximately 42% of the output (220 tonnes). The second most produced species was Indian white prawns contributing 210 tonnes to the total aquaculture production of Abu Dhabi Emirate in 2019, followed by Seabream (*Sparus aurata*) with 52 tonnes. And other species include Seabass (*Dicentrarchus labrax*) 30 tonnes and Nile tilapia 15 tonnes.

Total volume of aquaculture production

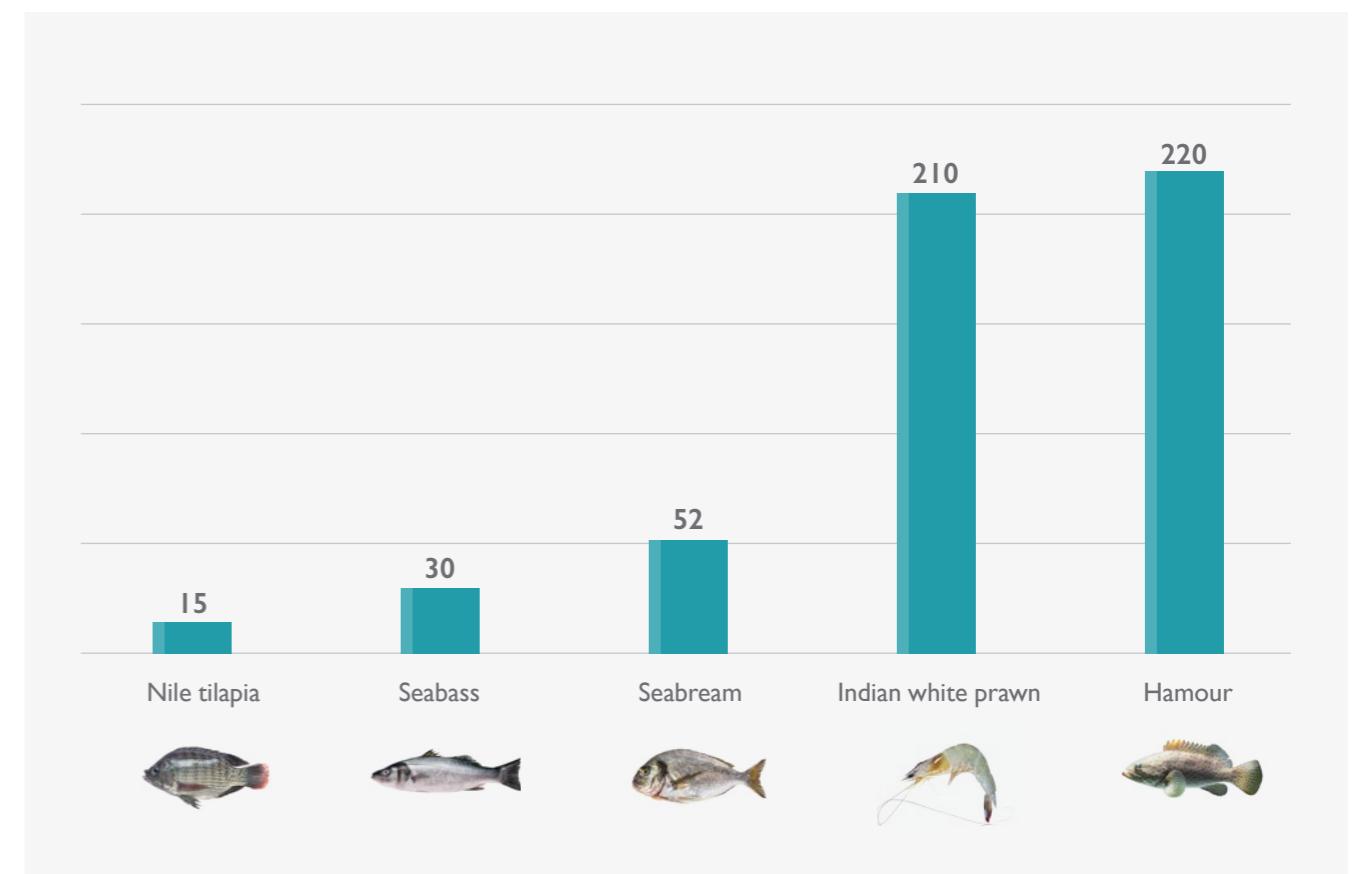


Figure 26 – Total volume of aquaculture production (tonnes) in 2019.

The total farm gate value associated with aquaculture production in 2019 was approximately 18 million AED. Hamour accounted for around 10 million AED of the total value, while the other species accounted for about 8 million AED (Figure 27).

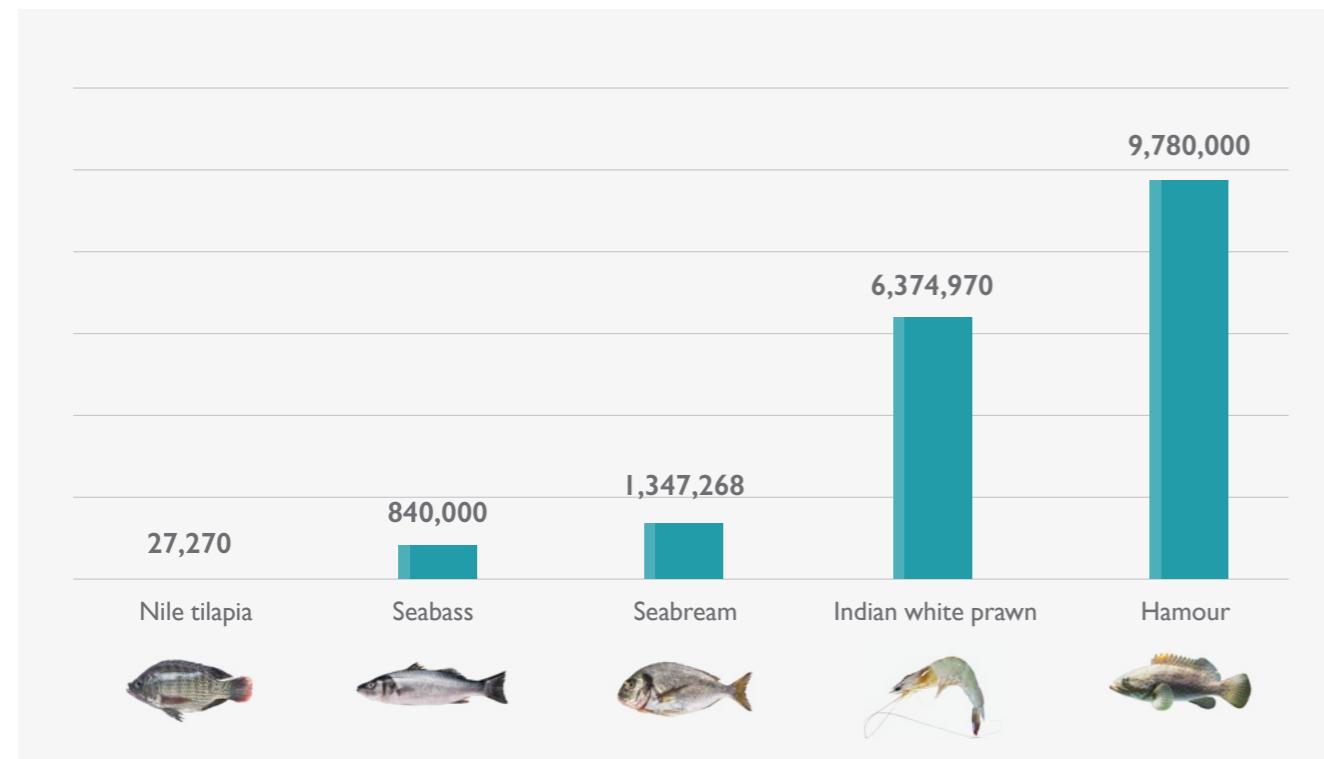


Figure 27 – Total value of aquaculture production (AED) in 2019.

Aquaculture production accounted for 527 tonnes in 2019 showing an apparent decrease compared to the previous year, which reached a peak at 808 tonnes. This is due to the fact that producers have stopped culturing low value species such as Nile tilapia. On the other hand, production of high value species such as Hamour drastically increased. On the contrary, the value of aquaculture production in 2019 is almost equal to the previous year, which is again attributed to the increased production of the high value Hamour (Figure 28).

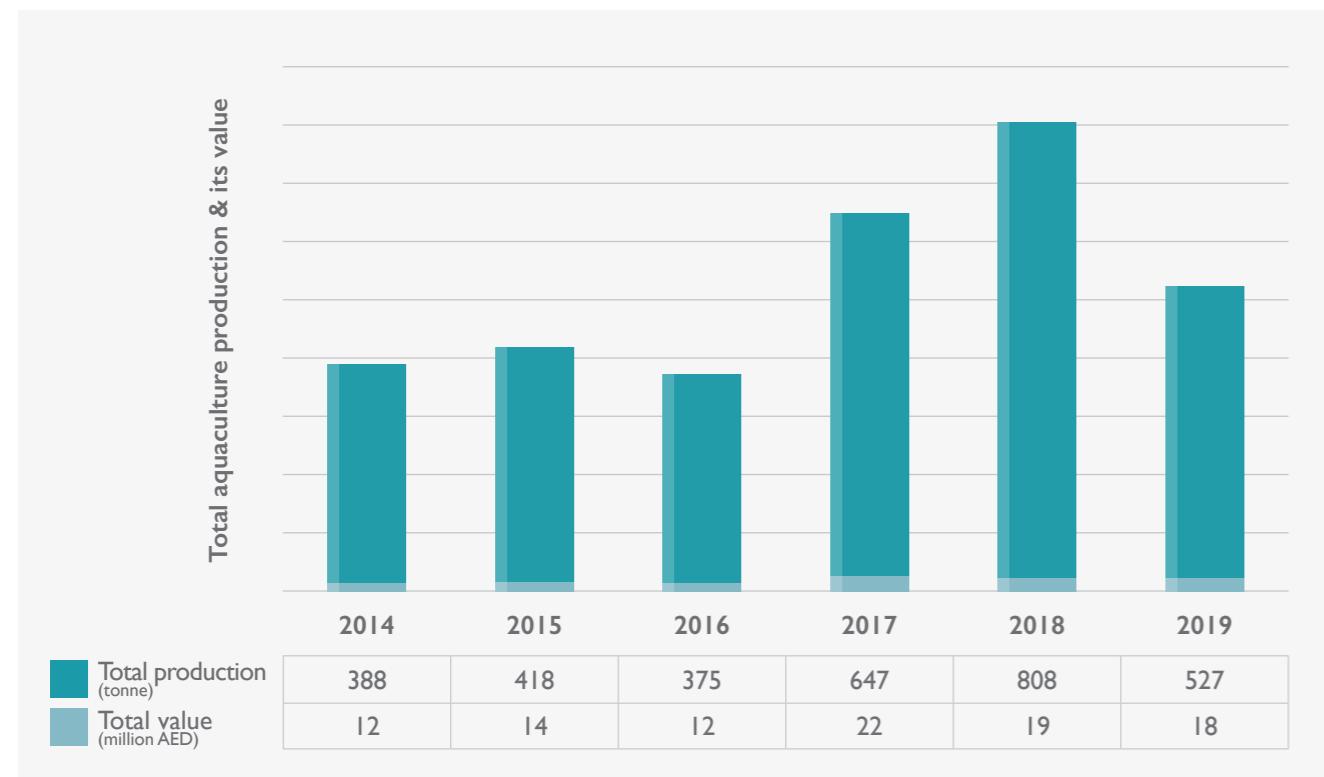


Figure 28 - Total aquaculture production and its value in Abu Dhabi Emirate from 2014 to 2019.

