Economic Indicators of the Arab Countries Fish Inter-trade

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ABSTRACT

The fish subsector is considered one of the most important sectors in many Arab countries and due to the challenges facing the sector, this research aimed at investigating the inter-trade and the economic indicators in the Arab countries. Data from the Arab Organization for Agricultural Development was computed to estimate the relative importance, coverage rate, trade exchange rate, exports share, commodity concentration coefficient, economic exposure and propensity to import and export. The comparative advantage is shown to be high only in Yemen and Mauritania based on the locations on coasts. Egypt has shown a good have high comparative advantages while Egypt has shown a higher production from aquacultures than all the rest of the countries. In general, Mauritania, Bahrain, Oman and Morocco have shown higher marginal propensity to export and other export-related indicators. Meanwhile, Bahrain, Kuwait and UAE have shown tendency to import. A great potential for economic integration between the Arab countries have been determined and it's highly recommended that the Arab Organization for Agricultural Development develop and lead a strategy for fish value chain improvement and integration.

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Introduction

The fish subsector is considered one of the most important sectors in many Arab countries for its contributions to food security. The contributions include; supply of animal protein, increasing incomes, poverty alleviation and job creation. These contributions are impactful particularly in the low food security and low-income countries especially in coastal and rural areas which, accordingly, reduces migration from rural to urban areas. According to the Arab Organization for Agricultural Development (2015a); the subsector also contributes to the Millennium Development Goals through; poverty alleviation, combating hunger, improving nutrition, and protecting the environment and biological diversity. This requires more attention to the subsector to improve productivity and increase efficiency. The Greater Arab Free Trade Area (GAFTA) possesses economic resources that enable it to achieve high levels of trade exchange in various fields including; enormous human potentials, vast geographical areas, and diversity in natural resources (Sadek 2011).

Remarkably; the global economic system is rapidly changing and countries tend to form economic blocs to benefit from the expansion of the market within the bloc. Hence; an Arab collective action has become a necessity by establishing an Arab bloc. Such a bloc will benefit the Arab countries through the expansion into the vast market and achieves a higher degree of stability and economic security. The above-mentioned benefits will certainly be achieved with the establishment of the GAFTA, especially if accompanied by flexible supply (Fawwaz and Soliman 2015).

In recent years; the efforts related to the development and sustainability of fish resources have made countries and modern societies to focus on the quantities of fish fished and farmed, as well as the methods of fishing and the equipment & tools used. This focus will have great impact on the responsible exploitation of this resource, as well as to ensure its renewal and avoid its exhaustion and advancement. To achieve the desired impact; the Arab Organization for Agricultural Development (2017a) requires the Arab countries to take several actions including; advanced production techniques, introduce more supportive services, attract more investment, limit the aquaculture pollution and enhance the final products.

Under the conditions of the deterioration of natural fisheries and low productivity; there is a great global interest to increase the production of fish from the aquacultures to secure sufficient supply of animal protein from fish. The Arab Organization for Agricultural Development (2018) also declares that fish production from aquaculture is growing rapidly in most parts of the world with average annual increase of 8.8% over the past three decades while the direct fishing rates from fisheries have been relatively stable.

The Arab Organization for Agricultural Development (2017b) in its strategy for aquaculture 2017-2037 determined the strengths, weaknesses, opportunities, and threads (SWOT analysis) for the aquaculture to be considered when planning the sector in the Arab countries.

Strengths
• Diversified geography and climate.
• Availability of some supporting services, training and guiding institutions.
• Diversified aquatic environments which supports the farming of different varieties.

Weaknesses
• Limited technologies and technical expertise in the field of education.

- Lack of specialized expertise in most Arab countries.
- Insufficient infrastructure and high prices of production inputs.
- Shortage in funding resources and risk insurance.
- Pollution of water sources and climate changes.
- Non-flexible legislative frameworks and poor performance of administrative and technical structures.

Opportunities
- Availability of production inputs including manpower.
- The growing demand for aquacultures.
- International treaties and government incentives.

Threads
- Environmental & biological changes and the spread of epidemics and diseases.
- High competition in the market.
- Tough international standards.

According to the Arab Organization for Agricultural Development (2015b); the fish production in the Arab countries in 2014 reached 4.5 million tons of which the production from aquaculture was 1.1 million tons constituting 24.4% while it constitutes for 50% globally. It's also noticed that the average per capita share of fish is estimated at 11.7 kg per year in Arab countries compared to about 19.9 kg per year globally. The production of fish from aquaculture exists mainly in Egypt due to several reasons that are not applicable to most of the Arab countries including; availability of expertise, technical & institutional capabilities, and relatively sufficient capacity-building programs & investments. This situation should ring the bell to quickly adopt aquaculture production. From this standpoint, the aquaculture subsector requires a holistic and future vision to contribute to achieving the sustainable development goals, especially those related to reaching zero hunger, providing food security & improved nutrition, ensuring sustainable consumption and production patterns, and the conservative & sustainable use of the oceans, seas and marine resources (Arab Organization for Agricultural Development, 2015a).

The Arab world has marine coasts estimated at 26.43 thousand kilometers in addition to rivers and internal water resources with of about 16.6 thousand kilometers. The Arab world's production of fish products is estimated at 4.51 million tons, with a value of about 11.52 billion US dollars, of which about 2.1 million tons are directed to export, with a value of more than 4.5 billion US dollars. However, the fish resources in the oceans, seas and other water surfaces that are geographically related to the Arab world suffer from many risks and technical, economic and environmental obstacles. These risks and obstacles include; overfishing, pollution, and the depletion of some fish species.

Despite of what the Arab countries is currently achieving from an export surplus in fish production, the obstacles previously mentioned in addition to the growing population increase and the growing food awareness among the Arab citizens, would cause a shortage in the available quantities of fish, which would result in a decrease in the average per capita share of fish and an increase in prices. Remarkably, there is also a certain possibility of a shortage of other sources of animal protein in the Arab countries due to other several reasons which will lead to a decrease in the quantities of animal protein available in the foreseeable future. Hence, there will be a greater need to expand fish production in the Arab region. Moreover; even with the Arab countries that are members of the Arab Free Trade Area posse the economic elements to improve the trade situation between them, the international fish trade in the region is still weak and needs to search for means and mechanisms to enhance trade exchange between the Arab countries and identify all trade barriers and restrictions in order to develop and improve its current status.

The research aims mainly to determine the volume of production, human resources and the efficiency of foreign trade in the Arab world during the period 2014 - 2016. It also seeks to achieve the following specific objectives; investigate the current situation of fish production and human resources, recognize the relative importance of the various sources of fish production, identify the features of foreign trade in the Arab region, and estimate the most important indicators of the efficiency of fish trade in the Arab world.

2. Materials and Methods

Data used is mainly secondary data collected from different sources including; Food and Agriculture Organization FAO of the United Nations and the Arab Organization for Agricultural Development. Descriptive and quantitative analysis methods were used, specifically the arithmetic mean, relative importance, coverage rate, trade exchange rate, exports share, commodity concentration coefficient and propensity to import and export. In order to investigate the Arab fish trade, several indicators are used (Fawwaz, 2016) including

2.1 Commodity Concentration

This indicator means the degree of concentration of exports, that is, whether a limited number of commodities dominate the exports of a country or not. It can be calculated by estimating the commodity concentration coefficient according to the following equation:

Commodity Concentration Coefficient =
$$100 * \sqrt{Sum\ (Y_i/Y)^2}$$

Where Y_i is the value of exports or imports of a particular commodity to or from a particular country, Y is the total value of total agricultural exports or imports.

2.2 Coverage Ratio

The Foreign Trade Coverage Ratio refers to the ratio between the value of exports and the value of imports between two countries or blocs This indicator refers to the country's commercial position, the efficiency of its foreign trade, and its ability to cover the expenses of its total imports from the proceeds of its exports. An increase in its value above 100% indicates a surplus in the country's balance of trade, since the value of exports is sufficient to cover import expenditures and provides the state with foreign exchange for that. It is estimated by the following equation

$$Coverage\ Ratio = \frac{Value\ of\ Exports}{Value\ of\ Imports} * 100$$

2.3 Trade Exchange Ratio

It is the quotient of the total exports divided by the total imports in a certain period of time, while the agricultural trade exchange ratio is the quotient of the agricultural exports divided by the agricultural imports during a certain period of time.

2.4 Economic Exposure

This indicator expresses to what extent the foreign trade is important for the gross domestic product, and it is also called the degree of economic openness as an expression of the extent of the economic openness of the country to the outside world. It expresses the need to avoid the total dependence of the state's economic activity on export and import, this necessarily means that the country's economy is easily exposed to external influences. Therefore, the rise of

this indicator is an indication of the rapid vulnerability of their economies to the fluctuations in their export markets. The degree of economic exposure is calculated according to the following equation:

Economic Exposure =

$$\frac{\textbf{Value of Exports } + \textbf{ Value of Imports}}{\textbf{Gross Domestic Product}} * \textbf{100}$$

2.5 Marginal Propensity to Export

This indicator indicates the extent to which intra-regional exports contribute to the formation of the GDP of countries. In other words, it shows the extent to which the economic activity of any country depends on the conditions prevailing in the export markets of this country. Therefore, if this indicator is high, this indicates low level of dependence of countries on the outside world, which makes the economies of countries less vulnerable to global economic fluctuations and makes them in a state of non-exposure to the outside world. The marginal propensity to export is calculated according to the following equation:

Marginal Propensity to Export =

$$\frac{\textbf{Value of Exports}}{\textbf{Gross Domestic Product}} * \textbf{100}$$

2.6 Marginal Propensity to Import

This indicator shows the extent to which a country is dependent on its imports and thus knowing the extent of its dependence on the outside world. It reflects the extent to which the country's national production is dependent on the global production that supplies it with goods in filling its needs. The marginal propensity to import is calculated according to the following equation:

Marginal Propensity to Import =

$$\frac{\textbf{Value of Imports}}{\textbf{Gross Domestic Product}} * \textbf{100}$$

3. Results

3.1 Human resources in the fishing subsector

The Arab countries hold more than 0.8 million jobs in the fishing subsector. Table 1 indicates the number of fishermen in each country. Remarkably, Somalia holds 25% of the total number (204,000) followed by Yemen, Morocco, Mauritania, Tunisia and Egypt which represent 50% of the total number (412,840). Other countries hold the rest of the 0.8 million jobs. An average of 89% of those fishermen use boat for fishing while the rest don't. fishermen in 10 countries; UAE,

Bahrain, Algeria, KSA, Palestine, Qatar, Kuwait, Lebanon, Libya, and Egypt are 100% using boats while in the rest of countries the percentage range from 99.96% down to 45.54%.

3.2 Production and relative importance of fish subsector

The total production of fish in the Arab world in 2016 from different sources was estimated at 4.9 million tons as shown in table 2, of which 62.1% comes from fisheries in addition to 26.4% and 11.5% from aquacultures and hatcheries, respectively. Egypt, Morocco, and Mauritania represent about 80% of the total production with 1.64, 1.47, and 0.77 million tons, respectively. The relative importance of each source varies from one country to another. Morocco and Mauritania are the top producers of fish from natural fisheries with 41.8% and 22.1% of the total Arab production in 2016, respectively. In aquaculture; Egypt produces 92.8% of the Arab total production. Egypt, also, produces more than half of the hatcheries' production followed by Tunisia, Oman, and Iraq. As for the comparative advantage; Yemen, Mauritania, and Libya enjoy higher indicator values compared to other countries with 11.96, 11.4, and 7.19 for them, respectively.

3.3 Exports and Imports

The total exports of fish from the Arab countries, as shown in table 3, is estimated as 1.031 million tons valued at 1.717 billion USD as an average for the period 2009-2016. Meanwhile, the average total imports estimated also at 1.031 million tons but for a value of 2.127 billion USD. Mauritania, Morocco, and Oman are the highest exporters while Egypt, UAE, and KSA are the highest importers. In Yemen, Mauritania, and Libya; the fish exports represent a big portion of the total exports with 50.73%, 48.35%, and 30.48% for each country, respectively. In other countries the percentage of the fish exports to the total country exports range from 10.03% down to almost 0%.

3.4 Self-sufficiency and per capita share of fish

The available quantities of fish for consumption in the Arab countries estimated at 4.166 million tons in 2016. The quantities vary extremely from country to another. In Egypt; the quantity estimated at 1.821 million tons followed by Morocco with 0.816 million tons. See figure 1.

Table 1. Human resources in the fishing subsector in the Arab world in 2016.

Country	Fishermen		% Fishermen using boats	
	#	%	Using boats	Not using boats
Jordan	760	0.1%	52.6%	47.4%
UAE	21,220	2.7%	100%	0.0%
Bahrain	9,164	1.2%	100%	0.0%
Tunisia	53,977	6.7%	88.3%	11.7%
Algeria	49,836	6.2%	100%	0.0%
KSA	7,181	0.9%	100%	0.0%
Sudan	12,800	1.6%	90.1%	9.9%
Syria	11,075	1.4%	86.9%	13.1%
Somalia	204,000	25.2%	45.5%	54.5%
Iraq	7,500	0.9%	89.3%	10.7%
Oman	48,333	6%	99.9%	0.1%
Palestine	3,477	0.5%	100%	0.0%
Qatar	3,193	0.4%	100%	0.0%
Kuwait	4,252	0.5%	100%	0.0%
Lebanon	6,500	0.8%	100%	0.0%
Libya	4,357	0.6%	100%	0.0%
Egypt	51,461	6.4%	100%	0.0%
Morocco	111,293	13.7%	79.2%	2.8%
Mauritania	88,000	10.9%	48.5%	51.5%
Yemen	108,109	13.3%	76.9%	23.1%
Total	806,488	100%	88.8%	11.2%

Source: compiled from the Arab Fishery Statistics Yearbook, 2018.

Table 2. Relative importance of fish production in the Arab world in 2016.

Country	Total production	Relative importance			Comparative advantage
		Fisheries	**Aquacultures**	**Hatcheries**	
Jordan	1.7	0.02	0.07	0.87	0.01
UAE	73.2	2.09	0.00	0.00	0.45
Bahrain	15.2	0.44	0.00	0.06	1.27
Tunisia	127	3.18	1.14	17.4	1.37
Algeria	102.1	2.86	0.14	1.48	0.16
Comoros	1.1	0.03	0.00	0.00	0.00
Djibouti	2	0.06	0.00	0.00	0.37
KSA	102	1.77	2.82	0.00	0.12
Sudan	42	0.95	0.64	0.02	1.88
Syria	2.8	0.06	0.06	0.00	0.025
Somalia	30	0.86	0.00	0.00	0.48
Iraq	41.9	0.45	1.8	10.86	0.26
Oman	279.9	7.99	0.01	12.62	2.37
Palestine	3.6	0.1	0.02	0.02	0.00
Qatar	14.5	0.42	0.00	0.00	0.00
Kuwait	16.5	0.47	0.02	0.00	0.01
Lebanon	5.4	0.12	0.08	0.00	0.03
Libya	3.9	0.1	0.3	0.00	7.19
Egypt	1640	9.61	92.8	51.93	0.15
Morocco	1465	41.8	0.08	3.94	1.6
Mauritania	773	22.1	0.00	0.00	11.4
Yemen	158.2	4.52	0.02	0.8	11.96
	4901	100	100	100	

Source: compiled from the Arab Fishery Statistics Yearbook, 2018.

Table 3. Relative importance of exports & imports of fish in the Arab world 2009-2016.

Country	Exports		Imports		% Total exports
	Quantity 000 tons	**Value m USD**	**Quantity 000 tons**	**Value m USD**	
Jordan	0.12	0.13	1.67	2.44	0.04
UAE	2.59	6.08	18.23	23.25	1.89
Bahrain	1.25	1.29	1.18	1.35	5.37
Tunisia	1.37	6.80	2.67	2.73	5.81
Algeria	0.09	0.29	2.90	3.64	0.68
Comoros	0.01	0.01	0.04	0.04	0.00
Djibouti	0.00	0.02	0.01	0.02	1.56
KSA	2.53	1.99	16.44	17.40	0.52
Sudan	1.10	3.31	0.07	0.08	7.96
Syria	0.01	0.02	0.41	0.28	0.11
Somalia	0.45	0.47	0.04	0.05	2.03
Iraq	0.02	0.11	2.31	1.66	1.11
Oman	11.02	9.58	2.18	2.10	10.03
Palestine	0.00	0.00	0.30	0.40	0.00
Qatar	0.09	0.12	2.90	3.14	0.00
Kuwait	0.02	0.07	2.76	6.55	0.04
Lebanon	0.03	0.09	2.00	3.99	0.10
Libya	0.12	0.95	0.66	0.86	30.48
Egypt	2.46	2.09	36.76	22.36	0.61
Morocco	25.25	41.99	6.20	7.46	6.67
Mauritania	45.12	16.19	0.02	0.00	48.35
Yemen	6.37	8.42	0.25	0.22	50.73

Source: compiled from the Arab Fishery Statistics Yearbook, 2018.

Table 4. commodity concentration of fish exports and imports in the Arab world.

Country	Commodity concentration coefficient	
	Exports	**Imports**
Jordan	0.11	1.34
UAE	1.58	3.27
Bahrain	3.57	1.88
Tunisia	5.60	2.08
Algeria	0.80	0.73
Comoros	0.25	0.23
Djibouti	0.56	0.06
KSA	0.80	1.70
Sudan	3.68	0.11
Syria	0.04	0.26
Somalia	1.73	0.09

Iraq	2.40	0.70
Oman	8.97	1.49
Palestine	0.03	0.78
Qatar	0.18	2.40
Kuwait	0.20	3.40
Lebanon	0.24	2.53
Libya	20.22	0.59
Egypt	0.66	3.63
Morocco	12.10	2.80
Mauritania	51.09	0.01
Yemen	42.52	0.14

Source: compiled from the Arab Fishery Statistics Yearbook, 2018.

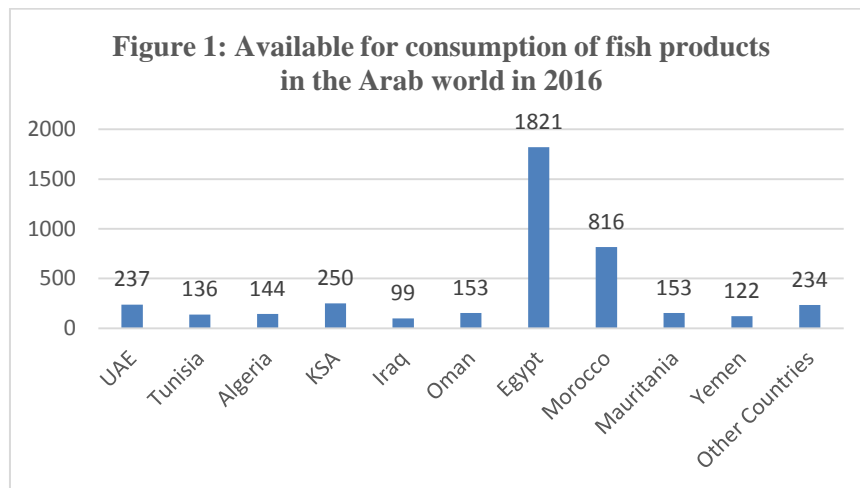**Table 5. Coverage ratio and trade exchange ratio of fish in the Arab countries 2009-2016.**

Country	Coverage Ratio				Trade Exchange			
	2009-2013	**2014**	**2015**	**2016**	**2009-2013**	**2014**	**2015**	**2016**
Jordan	10.9	2.2	4.6	1.4	0.2	0.0	0.1	0.0
UAE	22.7	18.4	22.0	22.5	0.2	0.2	0.1	0.1
Bahrain	90.1	72.4	82.4	71.3	1.3	0.5	1.9	0.7
Tunisia	282.7	138.2	196.5	182.4	0.7	0.3	0.5	0.5
Algeria	21.1	3.7	4.2	6.5	0.1	0.0	0.0	0.0
Comoros	93.3	48.3	0.0	0.0	0.4	0.2	0.0	0.0
Djibouti	30.5	15.6	80.7	112.7	1.0	0.0	0.3	0.3
KSA	24.3	5.9	5.7	5.9	0.2	0.1	0.1	0.1
Sudan	14.7	-	3,028	5,340	0.5	-	13.0	19.0
Syria	3.7	2.9	7.3	16.1	0.0	0.0	0.0	0.0
Somalia	1,070	360.5	751.5	1,249	6.5	6.3	9.5	18.1
Iraq	5.2	2.7	19.0	6.2	0.0	0.0	0.0	0.0
Oman	740.8	312.7	267.2	315.5	7.2	4.0	4.7	4.7
Palestine	3.3	0.1	0.2	0.0	0.1	0.0	0.0	0.0
Qatar	14.1	0.0	2.2	0.0	0.1	0.0	0.1	0.0
Kuwait	2.7	1.1	0.6	0.1	0.0	0.0	0.0	0.0
Lebanon	5.1	1.2	1.0	0.7	0.0	0.0	0.0	0.0
Libya	4.7	50.2	125.1	323.7	0.1	0.1	0.2	0.6
Egypt	11.0	6.0	6.3	8.3	0.1	0.1	0.1	0.1
Morocco	1,279.1	244.3	256.9	299.5	8.2	2.5	2.8	3.7
Mauritania	398,967	494,114	584,680	506,386	1,300	1,973	6,055	3,442
Yemen	9,308	4,788	1,051	2,269	51.2	41.3	9.4	20.5
Average	166.2	57.6	59.9	71.1	1.3	0.9	0.8	1.1

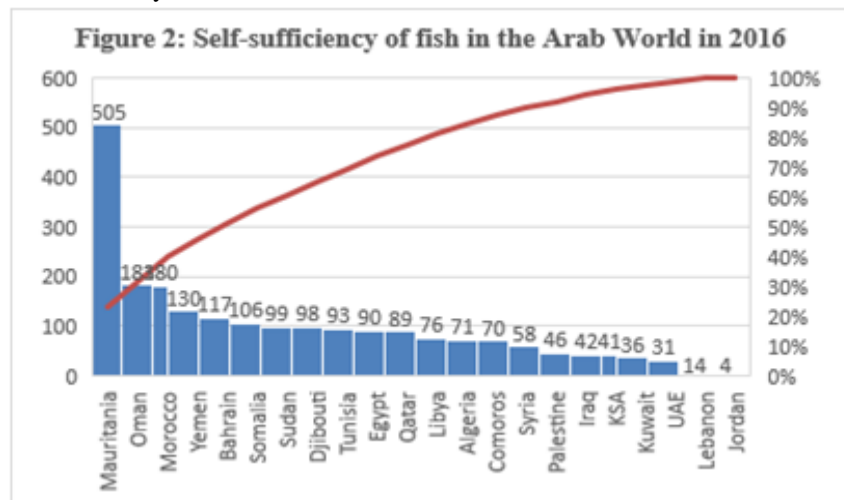Source: compiled from the Arab Fishery Statistics Yearbook, 2018.

Table 6. Economic exposure and marginal propensity to export and import of fish in the Arab countries 2014-2016.

Country	Fish trade economic exposure			Marginal propensity to export			Marginal propensity to import		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
Jordan	6.03	5.87	6.3	0.09	0.2	0.05	6.21	5.67	5.98
UAE	24.87	24.53	28.76	5.07	5.19	5.11	23.69	19.34	19.76
Bahrain	70.25	54.57	49.68	16.57	22.33	34.22	33.09	32.24	36.04
Tunisia	7.11	5.42	6.52	4.73	3.99	4.96	1.79	1.44	2.16
Algeria	0.64	0.46	0.54	0.04	0.03	0.04	0.51	0.43	0.59
Comoros	0.52	0.7	0.47	0.15	0	0	0.32	0.7	0.52
Djibouti	16.84	8.63	5.56	0.75	3.85	8.92	4.81	4.78	7.92
KSA	2.32	2.38	2.8	0.16	0.14	0.14	2.63	2.25	2.19
Sudan	0.01	0.01	0.002	0.02	0.01	0.01	0.01	0.01	0.01
Syria	0.36	0.33	0.48	0.02	0.02	0.05	0.47	0.31	0.31
Somalia	0.57	0.82	0.41	0.32	0.62	0.47	0.09	0.2	0.1
Iraq	2.48	1.31	0.62	0.02	0.03	0.03	0.61	1.28	2.46
Oman	19.45	23.11	24.24	20.55	18	14.75	3.69	5.11	4.7
Palestine	3.37	3.80	2.79	0.03	0.05	0.005	2.79	3.8	3.37
Qatar	1.81	4.84	6.23	1.34	0.60	0.53	4.89	4.23	1.28
Kuwait	27.82	27.1	19.56	0.21	0.18	0.04	19.36	26.93	27.78
Lebanon	4.44	4.73	4.67	0.06	0.05	0.05	4.6	4.68	4.39
Libya	4.26	4.46	1.82	1.75	2.48	3.25	0.066	1.98	1.01
Egypt	1.64	1.23	1.29	0.08	0.58	0.14	1.21	1.17	1.51
Morocco	14.53	14.33	16.18	14.66	13.13	13.48	1.52	1.19	1.06
Mauritania	43.06	46.49	55.76	55.76	46.48	43.06	0.01	0.01	0.01
Yemen	2.28	2.75	4.25	4.18	2.55	2.20	0.07	0.2	0.09
All	4.06	3.7	3.94	2.30	2.20	2.39	1.65	1.5	1.67

Source: compiled from the Arab Fishery Statistics Yearbook, 2018.

Figure 1: Available for consumption of fish products in the Arab world in 2016

Source: compiled from the Arab Fishery Statistics Yearbook, 2018.

Figure 2: Self-sufficiency of fish in the Arab World in 2016

Source: compiled from the Arab Fishery Statistics Yearbook, 2018.

Figure 3: Per capita chare of fish in the Arab world in 2016
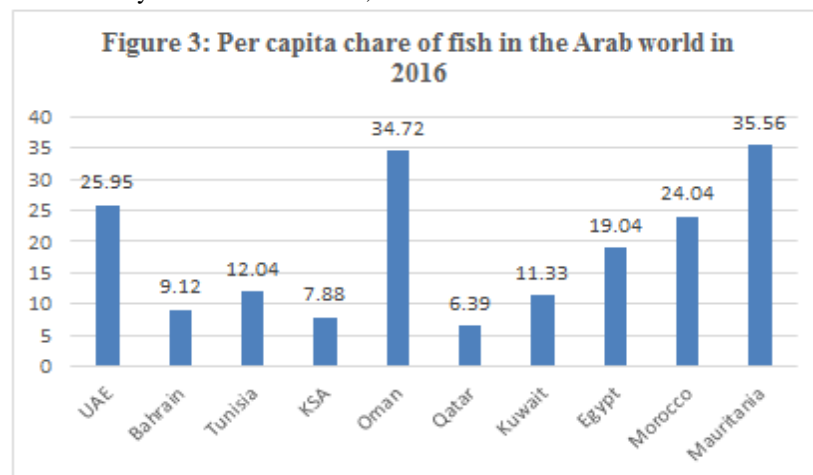
Source: compiled from the Arab Fishery Statistics Yearbook, 2018.

Mauritania, Oman, Morocco, Yemen, Bahrain, and Somalia are the only countries that are self-sufficient of fish production in 2016 as shown in figure 2. Remarkably, Mauritania is 505% self-sufficient. Sudan, Djibouti, Tunis, Egypt, and Qatar are relatively self-sufficient with ratios range from 99% to 89%.

As for the per capita shares of fish; figure 3 shows that Mauritania, Oman, UAE, Morocco, and Egypt are the top in this regard.

3.5 Trade efficiency indicators

3.5.1 Commodity concentration

As shown in table 4; Mauritania and Yemen are mainly counting on the fish exports with concentration coefficients estimated at 51.09 and 42.52 for both countries, respectively. Relying on fish exports in other countries vary from one to another. The coefficient ranges from 20.22 in Libya to 0.03 in Palestine. As for the concentration of imports; Egypt has the highest coefficient estimated at 3.63 followed by Kuwait and UAE with coefficient values of 3.4 and 3.27, respectively.

3.5.2 Coverage ratio

As shown in table 5; Mauritania is achieving exceptional coverage ratio equal to 506,386 in 2016 while Yemen and Somalia are achieving very high ratios equal to 2,269 and 1,249 respectively. Other countries such as; Libya, Oman, Morocco, Tunisia and Djibouti are achieving relatively higher ratios comparing to the rest of the countries, the ratios are

323.7, 315.5, 299.5, 182.4 and 112.7 respectively. A general notice from the same table is the fluctuating ratios from year to another for most of the countries. Although Sudan has achieved a very high coverage ratio in 2016 equals to 5,340, however, it's noticed that this ratio is highly fluctuated.

3.5.3 Trade Exchange

The data presented in table 5 indicates the exchange ratios for all Arab countries. Like the coverage ratio, Mauritania is ranked first with very high ratio of 3,442. Then come Yemen and Somalia with ratios of 20.5 and 18.1 respectively as the higher countries after Mauritania. Oman and Morocco are achieving a slightly high ratios compared to the rest of the countries with 4.7 and 3.7 respectively. The main notice is that the exchange ratios are fluctuating in most of the countries over time.

3.5.4 Economic exposure

According to data presented in table 6; the fish trade is very important to Mauritania and Bahrain as they have the highest economic exposure ratios estimated at 55.76 and 49.68, respectively. Other countries such as UAE, Oman, Kuwait and Morocco also show relatively higher economic exposure for fish trade with ratios estimated at 28.76, 24.24, 19.56 and 16.18 respectively in 2016.

3.5.5 Marginal propensity to export and import

As per the data shown in table 6; Mauritania, Bahrain, Oman and Morocco are tending to export big quantities of fish. The marginal propensity to export for these countries are estimated at 43.06, 34.22, 14.75 and 13.48 respectively in 2016. Meanwhile; Bahrain, Kuwait and UAE are tending to import fish and their marginal propensity to import are estimated at 36.04, 27.78 and 19.76 respectively in 2016. Noticeably, Bahrain has achieved higher propensity to export and import in 2016 which might be due to the export and import of specific varieties.

4. Discussion

Although the fish subsector in the Arab countries encounters several weaknesses which are mostly technical expertise issues, however, these weaknesses can be turned in strengths. In addition to that, the existing strengths which are mainly geographical, climatic and environmental diversification aspects can highly contribute to the countries' GDPs especially when considering the increasing demand on fish globally.The human resources are very important in this sector. Somalia, Mauritania and Yemen represent almost half of these resources. However, 54.5%, 51.5% and 23.1% of the human resources in these countries are not using boats although the great majority of the production is coming from fisheries. Somalia by itself represent one quarter of the human resources and its recorded production is very low apparently due to the military conflicts which also reflected in the low comparatives advantage. Two countries; Yemen and Mauritania enjoy high comparative advantages; 11.96 and 11.4 respectively. Considering both human resources and comparative advantage in those two countries require careful attention to benefit from them as source of fish for the whole Arab world.

The source of fish varies from fisheries, aquacultures and hatcheries. Morocco and Mauritania have the highest relative importance in fish from fisheries (41.8 and 22.1) while Egypt has the highest relative importance in both aquacultures and

hatcheries (92.8 and 51.9). These results give a strong indication for potential integration and knowledge transfer which will be reflected in higher production from all sources. Mauritania is the top exporter with 45.12 thousand tons (followed by Morocco with 25 thousand tons) and, at the same time, its fish exports represent 48.35% of its total exports. The exchange with the highest importers (UAE, Egypt and KSA with imports equal to 23.25, 22.36 and 17.40 thousand tons respectively) would result benefits for all parties. These indicators are reflected into higher export commodity concentration ratios for Mauritania and Yemen.

Certain countries (Mauritania, Bahrain, Oman and Morocco) show tendency to export fish and others (Bahrain, Kuwait and UAE) show tendency to import. The most important producers and exporters of fish are located on different coasts and have a diversified fish varieties that meet the whole Arab countries' preferences. Adding to this; Egypt has a very good experience in Aquaculture. This leads to a high potential integration, knowledge transfer and investment within the whole Arab countries. It's highly recommended that the Arab Organization for Agricultural Development develop and lead a strategy for fish value chain improvement and integration.

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