

## ECONOMIC STUDY ON FISH CATCH AND FISHERY FOREIGN TRADE IN ISLAMIC AFRICAN COUNTRIES

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### ABSTRACT

Twenty-seven Islamic countries are situated in Africa. In spite of extensive and richness of their water resources, fish catch is only 27% of total Islamic countries (57). The majority of group countries of the study (22 out of 27) are ranked in world levels as low Income Food Deficit countries (LIFDC's).

Aims of the study are (1) investigating existing magnitude of fish catch from capture fisheries and aquaculture in Arab and non-Arab group countries of the study, and Forecasting fish catch and per-capita fish share, (2) Investigating immediate magnitude of import & export fishery foreign trade and measuring efficiency of their fishery foreign trade, direction and means of integration.

Descriptive economic analysis and econometric methods have been used. Time-series data for the period (1986-2000) has been analyzed. Exponential smoothing techniques were used.

Forecasted fish catch from capture fisheries and aquaculture by the year 2005 is expected to increase per-capita fish consumption to about 10.1 kg compared to world average of 15.8 kg in the period (1997-99). To attain the world average, the group countries of the study has to cooperate together to develop fish catch from their fisheries both vertically and horizontally so as to attain the additional fish catch required by 2005 which is calculated in the study by about 2858.8 thousand tons in stead of importing fish. Directions of fishery import and export foreign trade intra the studied countries are only 19.4% and 2.9% of total value of their foreign trade respectively. To attain economic integration several recommendations have been discussed.

### INTRODUCTION

Fifty-seven countries out of two hundreds and twenty four countries in the world are Islamic countries. They are situated in four continents. Twenty-seven Islamic countries are situated in Africa (Fig.1), ten of these countries are Arab countries, they are Algeria, Comoros, Djibouti, Egypt, Libya, Mauritania, Morocco, Somalia, Sudan and Tunisia, and the remaining seventeen are non-Arab countries, they are Benin, Cameroon, Eritrea, Gabon, Gambia, Guinea, Guinea Bissau, Mozambique, Nigeria, Senegal, Sierra Leon, Togo, Burkina Faso,

Chad, Mali, Niger, and Uganda. The last five countries are landlocked, (Anon., 2003).

Total population in Islamic African countries (27) in the year 2000 was about 439.2 million inhabitants, which is about 34.3 % of total population in Islamic countries (57). Islamic countries in the continent have substantial natural marine as well as inland water resources (El-Zalaki *et al.*, 1976). Territorial marine waters in Islamic African countries extend to about 683.0 thousand Km<sup>2</sup> in both Atlantic and Indian Oceans including Mediterranean and Red Seas which are characterized by fertile fisheries, The total area of inland water resources in these countries amounts to about 386 thousand Km<sup>2</sup> (Bonzon and Benoit, 1988). Human and capital fishery

resources in Arab and non- Arab African countries are of great potentials as well. (Bonzon,1988, and El- Karashily, 1991).

Nevertheless, magnitude of fish catch from marine and inland fishery resources in Islamic African countries is rather low , it was about 3887.5 thousand tons in the year 2000 which represents 27.2 % and 3 % of fish catch in total Islamic countries (57) and in the overall countries (224) respectively in that year. ( FAO , 2000 b,c) .Productivity of marine as well as inland fishery water resources in Islamic African countries in the year 2000 were only about 3.44 tons / Km<sup>2</sup> , 3.02 tons / Km<sup>2</sup> respectively . For marine fisheries , the productivity varied between a low level of about 110 .K. g./Km<sup>2</sup> in Guinea Bissau and a level of about 15.95 ton/ Km<sup>2</sup> in Senegal . For inland water fishery , the productivity varied between about 20 K.g./ Km<sup>2</sup> in Somalia and a level of about 35 ton / Km<sup>2</sup> in Sierra Leon .

Fish catch from these countries (27) can not cover their fish consumption , fish food gap was occurred in the majority of group countries . Per- Capita apparent fish consumption share in 1997- 1999 period in the group countries of the study was only 8.5 K.g. compared to about 10.9 K.g., and about 15.8 K.g. in total Islamic countries and world level in that period respectively. (FAO , 2000 c).

The majority of Islamic African countries (22out of 27) are ranked by world organization as Low Income Food Deficit Countries ( L I F D C'S ) .They are about 27.8 % of total world L I F D C'S ( 79 countries ) , ( FAO , 2000 b ) .

The present study is an attempt to deal with fish food gap by raising fish catch and productivities of fishery resources to fulfil food security and lessen defecit in fishery foreign trade in the group countries of the study.

#### **Aim of Study**

- 1- To investigate existing magnitude of fish catch from capture fisheries (marine and inland) as well as from aquaculture in Islamic African countries; and forecast expected

magnitude of fish catch from their capture fisheries as well as from aquaculture, and per – capita fish share.

- 2- To investigate existing magnitude of quantity and value of fishery foreign trade (Import & Export) in these countries, the trade balance; and measure efficiency of fishery foreign trade and direction and means of integration.

### **MATERIALS AND METHODS**

Data and information needed for the study has been collected from: (1) FAO year-books of fishery statistics, and (2) Saleh center for Islamic economics affiliated to Al-Azhar University.for the period 1986- 2000 .

To achieve study objectives, the group of Islamic African countries (27 country) was divided into two sub-groups; (1) Arab countries (10 countries) and (2) non-Arab countries (17 country). Population and Per-capita fish consumption of these countries in the year 2000 are listed in the appendix.

Descriptive economic analysis and econometric methods were used in the study. Time-series data for the period (1986-2000) has been analyzed. Exponential smoothing technique was adopted to forecast future trends of fish catch by the year 2005.

Brown linear one smoothing parameter model (1) and Holt-Winter's two smoothing parameters model (2) (Makridakis, S. et al, 1983) has been used as follows:

$$F_{t+m} = a_t + b_t(m) \quad (1)$$

$$F_{t+m} = s_t(m) + b_t(m) \quad (2)$$

Where:  $F_{t+m}$  is the forecasted fish catch from each of capture fisheries and from Aquaculture for each sub-groups of African Islamic countries in the period of study at time (t) and number of years (m) ahead to be forecasted.

$a_t$  and  $b_t$  represent two parameters in Brown model (1).

$S_t$  represents a parameter in Holt-Winter model (2), it is equal to:

$$S_t = \alpha x_t + (1 - \alpha) (s_{t-1} + b_{t-1})$$

Where:  $\alpha$  is the first smoothing parameter of the model.  $x_t$  is fish catch in the base year (t), and  $b_t$  represent another parameter in the model, it is equal to:

$$b_t = y(S_t - S_{t-1}) + (1-y)b_{t-1}$$

where  $y$  is the second smoothing parameter of the model.

The more close the value obtained for each of  $\alpha$  and  $y$  smoothing parameters to zero point, the more statistically best fitted. Sum of squared residuals and root mean squared error will be taken into consideration in comparing statistical for Brown linear model and Holt-Winter two-parameter model.

Time-series package (Lilien, M. and E. Hall, 1988) has been used for data processing.

Expected population in each of the two sub-groups of Islamic African countries by the year 2005 will be calculated according to the following equation (Sarhan, A. et al. 1976):

$$P_n = P_0 (1+r)^n$$

Where:  $P_n$  the expected population by the year (2005),  $p_0$  population in the base year (2000) and  $r$  is annual population growth rate calculated by geometric mean for each rate of individual countries in the two sub-groups of study, for Islamic African countries (10), the calculated rate was equal to about 2.745%.

To measure efficiency of fishery foreign trade Islamic African countries, the following indicators (Bakry, K. and M. Yonis, 1983) will be calculated:

**Rate of coverness:** which relate total value of fishery exports in Islamic African countries to total value of their fishery imports as follow:

$$\text{Rate of coverness} = \frac{\text{Value of exports}}{\text{Value of imports}} \times 100$$

The increase of the ratio than 100% results value in the balance of fishery trade.

**Share in world fishery market:** which relate total value of fishery export trade for Islamic

African countries to total world value of fishery export fishery market as follows:

$$\text{Share in world fishery market} = \frac{\text{Value of exports (studied countries)}}{\text{Value of world exports}}$$

The increase of the share reflects comparative export advantage of Islamic African countries in world fishery market.

**Individual share in fishery foreign trade:** which relate total value of fishery export and import trade total population in the studied countries as follow:

$$\frac{\text{Total value of (Exports + Import)}}{\text{Total population}}$$

The increase of individual share reflects importance of fishery foreign trade in the country.

## RESULTS

### Existing magnitude of fish catch in Islamic African countries in the year 2000:

Total marine fish catch from the Islamic African countries (27) in the year 2000 was about 2350.8 thousand metric ton (m.t.). It constituted about 24.6% of the total marine fish catch from the entire Islamic countries (57). The major catch was taken from FAO statistical Area (34) (EC Atlantic).code The remaining part was taken from (37) and (51) code Statistical Areas in Mediterranean and West Indian respectively ( Table 1).

Total Inland fish catch from the Islamic African countries in that year was about 1164.9 thousand m.t. It constituted about 44.5% of total Inland fish catch from the entire Islamic countries (table 1).

Total aquaculture fish production in Islamic African countries in that year was about 371.8 thousand m.t. It constituted about 17.5% of total aquaculture production from the entire Islamic countries.(table 1)

Arab and non-Arab Islamic African countries differ in the magnitude of their fish

catch from one fishing area to another. The majority of Inland fish catch was attributed by non-Arab countries (17), the majority of aquaculture production was attributed on the other hand by Arab countries (10). As to marine fish catch the contribution of the two sub-groups of studied countries was rather equal.

Grand Total of fish catch from the two sub-groups was about 3887.5 thousand m.t which is about 27.2% only of grand total fish catch from the entire Islamic countries in that year of about 14308.9 thousand m.t. The contribution of the two sub-groups of the studied countries in grand total fish catch was rather equals of about 1976.6 thousand m.t. for Arab countries and about 1910.9 thousand m.t. for non-Arab.

**Expected magnitude of fish catch from capture fisheries as well as from aquaculture from Islamic African countries by the year 2005:**

Fish catch from capture fisheries in the year 2005 in Islamic African countries is expected to reach according to Holt-winter model (best fitted statistical model) about 1800.43 thousand m.t. for Arab countries and about 2335.351 thousand m.t. for non-Arab countries, with expected grand total of about 4135.781 thousand m.t.( Table 2 ) . Fish catch from aquaculture in the year 2005 in Islamic African countries is expected to reach about 911.047 thousand m.t. for Arab countries and about 37.657 thousand m.t. for non-Arab countries, with expected grand total of 948.702 thousand m.t. Fish catch from capture fisheries as well as from aquaculture for total Islamic African countries by the year 2005 is expected to reach about 5084.483 thousand m.t. (Table2).

**Expected per-capita fish consumption in Islamic African countries by the year 2005.**

Expected population in Islamic African Arab countries by the year 2005 will be about 214.85 million inhabitants with expected per-capita fish share of about 8.4 kg from capture fisheries and about 4.2 kg from aquaculture with a total of about 12.6 kg (Table 3) compared to 7.2 kg in 1997-99 (FAO, 2000 b).

Expected population in Islamic African non-Arab countries by the year 2005 will be about 286.75 million inhabitants with expected per-capita fish share of about 8.1 kg from capture fishery and about 0.1 kg only from aquaculture with a total of about 8.2 kg compared to about 9.5 kg in 1997-99 (FAO, 2000 b) .

Expected population in the whole Islamic African countries by the year 2005 will be about 501.54 million inhabitants with expected per-capita fish share of about 8.2 kg from capture fisheries and about 1.9 kg only from aquaculture with a total of about 10.1 kg compared to 8.5 kg in 1997-99 (FAO, 2000 b).

**Existing magnitude of quantity and value of fishery foreign trade in Islamic African countries and the resultant trade balance in the year 2000 :**

Total quantity of export fishery trade in Islamic African countries in that year was about 507.2 thousand m.t., which is about 36.2% of total fishery export trade in the entire Islamic countries, which is about 6.7% only of world fishery export trade in that year. .Arab and non-Arab Islamic African countries constituted about 25.2% and 11.0% of the fishery export trade in the entire Islamic countries respectively.( Table 4 )

**Table (1):** Fish Production from Islamic Countries and Other Islamic Countries from Capture Fisheries and Aquaculture in the Year 2000. (Q = 10<sup>3</sup> m.t)

Islamic Countries	Capture Fisheries										Aquaculture Total	Grand Total
	Inland Water	Marine Water					Marine Total	Capture Total				
		FAO Statistics Areas										
	31	34	37	51	57	71						
<b>African</b>												
Arab (10)	305.1	-	985.1	226.0	115.5	-	-	1326.6	1631.7	344.9	1976.6	
Non-Arab (17)	859.8	-	985.6	-	38.6	-	-	1024.2	1884.0	26.9	1910.9	
Total (27) %*	1164.9	-	1970.7	226	154.1	-	-	2350.8	3515.7	371.8	3887.5	
<b>Other (No n-African)</b>												
Arab (11)	14.1	-	3.6	108.1	319.6	-	-	4313	445.4	20.4	465.8	
Non-Arab (19)	1439.0	64.0	-	462.8	1165.1	1179.5	3907.4	6778.8	8217.8	1737.8	9955.6	
Total (30)	1453.1	64.0	3.6	570.9	1484.7	1179.5	3907.4	7210.1	8663.2	1758.2	10421.4	
<b>Entire Islamic Countries</b>												
Arab (21)	319.2	-	988.7	334.1	435.1	-	-	1757.9	2077.1	365.3	2442.4	
Non-Arab (36)	2298.8	64.0	985.6	462.8	1203.7	1179.5	3907.4	7803.0	10101.8	1764.7	11866.5	
Total (57) %	2618.0	64	1974.3	796.9	1638.8	1179.5	3907.4	9560.9	12178.9	2130.0	14308.9	
(100.0)	8801.1	1830.6	3523.1	1485.0	3902.3	4707.8	9898.8	86047.6	94848.7	35585.1	130433.8	

\* % From Entire Islamic Countries.

Source: Collected and Calculated from: (1) FAO. 2000 b. Fishery Yearbook Statistics, Catch and Landing, Vol. 90/1, Rome, Italy.

(2) FAO. 2000 c. Fishery Yearbook Statistics, Aquaculture production, Vol. 90/2, Rome, Italy.

**Table (2):** Expected Magnitude of Fish Catch from each of Capture Fisheries and Aquaculture in Islamic African Countries by the Year 2005 According to Brown and Holt-Winter Models.

Category	Islamic African Countries				Non-Arab			
	Arab		Non-Arab		Arab		Non-Arab	
	Capture	Aquaculture	Capture	Aquaculture	Capture	Aquaculture	Capture	Aquaculture
Forecasting Models	Brown's Model	Holt's Model	Brown's Model	Holt's Model	Brown's Model	Holt's Model	Brown's Model	Holt's Model
Parameters:								
Alpha	0.192	0.140	0.999	0.980	0.310	0.160	0.066	0.000
Beta	-	0.740	-	1.000	-	1.000	-	0.220
Statistical Tests:								
Sum of Squared Residuals	127699.7	117806.8	6997.862	6925.102	111322.3	108629.4	355.326	352.806
Root Mean Squared Error	92.268	88.622	21.599	21.487	86.148	85.1	4.862	4.85
End of Period Level:								
Mean Trend	1537.759	1553.166	344.800	344.273	1852.910	1878.045	27.305	29.300
Forecasted Fish Catch	30.019	49.453	113.347	113.355	61.655	91.461	1.496	1.671
Thousand m.t. 2005	1687.855	1800.430	911.533	911.047	2161.185	2335.351	34.783	37.657

Source: Study Results.

**Table (3):** Expected Per-Capita Fish Consumption in Islamic African Countries by the Year 2005 According to Holt-Winter Model.

African Islamic Countries	Population in year 2000 (million)	Annual Population Growth Rate (r) (%)	Expected Population in year 2005 (million)	Expected Fish Catch in Year 2005 (Thousand m.t.)		Per-Capita Fish Consumption Share (Kg/man)		Total (Kg/man)
				Capture	Aquaculture	Capture	Aquaculture	
Arab	188.7	2.629	214.85	1800.430	911.045	8.4	4.2	12.6
Non-Arab	250.5	2.745	286.75	2335.351	37.657	8.1	0.1	8.2
Total	439.2	2.686	501.54	4135.781	948.702	8.2	1.9	10.1

**Source:** Collected and Calculated from:

- (1) FAO. 2000 c. Fishery Yearbook Statistics, **Aquaculture Production**, Vol. 90/2, Rome, Italy.
- (2) Anon . 2003; Inter. Conf. Of Fish Resources and food Security in Islamic and Arab countries , Al-Azhar University , Cairo , Egypt , 22-24 Oct .
- (3) Table (1)
- (4) Table (2).

**Table (4):** Fishery Foreign Trade in Quantity (Q) and Value (V) for Islamic African Countries and Other Islamic Countries in the Year 2000.  
(Q = 10<sup>3</sup> m.t.; V = 10<sup>6</sup> US \$)

Islamic Countries	Export (E)				Import (I)				Balance	
	Q	%*	V	%*	Q	%*	V	%*	Q	V
<b>African</b>										
Arab (10)	353.3	25.2	1158.7	25.2	247.1	15.0	215.6	16.2	+ 106.2	+ 943.1
Non-Arab (17)	153.9	11.0	475.3	10.4	796.5	48.2	329.7	24.8	- 642.6	+ 145.6
Total (27)	507.2	36.2	1634.0	35.6	1043.6	63.2	545.3	41.0	- 536.4	1088.7
<b>Other (Non-African)</b>										
Arab (11)	66.2	4.7	241.8	5.3	129.8	7.9	236.2	17.8	-63.6	+ 5.6
Non-Arab (19)	829.4	59.1	2714.7	59.1	477.9	28.9	547.7	41.2	+ 351.5	+ 2167.0
Total (30)	895.6	63.8	2956.5	64.4	607.7	36.8	783.9	59.0	+ 287.9	2172.6
<b>Entire Islamic Countries</b>										
Arab (21)	419.5	29.9	1400.5	30.5	376.9	22.8	451.8	34.0	+ 42.6	+ 948.7
Non-Arab (36)	983.3	70.1	3190.0	69.5	1274.4	77.2	877.4	66.0	- 291.1	+ 2312.6
Total (57) %***	1402.8 6.7	100.0	4590.5 8.6	100.0	1651.3 8.0	100.0	1329.2 2.3	100.0	-248.5	+ 3261.3
World Total	20864.3		53335.2		20750.6		57866.4		+ 113.7	- 4531.2

\*% From Entire Islamic Countries.

\*\*% From World Total.

Source: Collected and Calculated from: FAO, 2000 a. Fishery Yearbook Statistics, **Commodities**, Vol. 90, Rome, Italy.



Total quantity of import fishery trade in Islamic African countries in that year was about 1043.6 thousand m.t., which is about 63.2% of total fishery import trade in the entire Islamic countries which is about 8.0% only of world fishery import trade in that year. Arab and non-Arab Islamic African countries constituted about 15.0% and 48.2% of the fishery import trade in the entire Islamic countries respectively. (Table 4).

The resultant fishery trade balance in quantity for Islamic African countries in that year was in deficit quantity by about -536.4 thousand m.t. The corresponding trade balance for other Islamic non-African countries in that year were in surplus quantity by about 287.9 thousand m.t. (Table 4).

Generally, fishery trade balance in the entire Islamic countries in that year was in deficit amounted to about -248.5 thousand m.t., which is caused primarily by non-Arab Islamic countries. (Table 4).

Total value of export fishery trade in Islamic African countries in that year was about 1634.0 million U.S. \$ which is about 35.6% as well of total value of fishery export trade in the entire Islamic countries which is about 8.6% only of total value of world fishery export trade in that year. Arab and non-Arab Islamic African countries constituted about 25.2% and 10.4% as well of the value of fishery export trade in the entire Islamic countries respectively, (Table 4).

Total value of Import fishery trade in Islamic African countries in that year was about 545.3 million U.S. \$ which is about 41.0% only of total value of fishery import trade in the entire Islamic countries which is about 2.3% only of total value of world fishery import trade in that year. Arab and non-Arab Islamic African countries constituted about 16.2% and 24.8% of the

value of fishery import trade in the entire Islamic countries respectively. (Table 4).

The resultant value of fishery trade balance for Islamic African countries in that year was in surplus value by about 1088.7 million U.S. \$, the corresponding value of trade balance for other non African Islamic countries was in surplus too by two-folds, the corresponding value of foreign fishery trade in the entire Islamic countries was in surplus by three-folds. (Table 4).

#### **Efficiency of fishery foreign trade in Islamic African countries and direction.**

Rate of Coverness calculated for Islamic African countries was about 299.7% resulting in surplus value of their fishery trade balance. The corresponding ratio for Islamic non-African countries was higher with a ratio of about 377.2%. But, taken into consideration Islamic Arab African countries, the calculated ratio was as high as 537.4% which is higher than any other corresponding rate for the other groups of Islamic countries (Table5).

Share in world fishery market for the entire Islamic countries was about 8.6% only. Share of Islamic African countries was about 3.06%, the remaining share was attributed by Islamic non-African countries 5.5%. Share of Islamic Arab African countries was two folds the corresponding share for Islamic non-Arab African countries (Table5).

Individual share in fishery foreign trade for Islamic African Arab countries was equal to about 7.28 U.S. \$ which is higher than any other corresponding share. It decreased to about 3.21 U.S. \$ in the case of Islamic African non-Arab countries. The share of the remaining categories in the table was rather equal World individual share was as high as 18.36 U.S. \$(Table5).

**Table 5:** Efficiency of Fishery Foreign Trade in Islamic African Countries in the Year 2000.

Islamic Countries	Rate of Coverness (%)	Share in World Fishery Market (%)	Individual Share in Fishery Foreign Trade (US \$)
African Arab (10)	537.4	2.172	7.28
Non-Arab (17)	144.2	0.891	3.21
Total (27)	299.7	3.064	4.96
Other (Non-African) Arab (11)	102.4	0.453	5.00
Non-Arab (19)	495.7	5.090	4.39
Total (30)	377.2	5.543	4.45
Entire Islamic Countries Arab (21)	310.0	2.626	6.51
Non-Arab (36)	363.5	5.981	4.09
Total (57)	345.4	8.607	4.63
World Total	92.2	100.0	18.36

Source: Study of Results.

#### Direction of fishery foreign trade:

Data on direction of fishery foreign trade (import & export) for the group countries of the study (27) was only available for five Arab countries Viz., Egypt, Algeria, Morocco, Sudan and Tunisia and for three non-Arab countries Viz., Chad, Cameroon and Gabon. (FAO, 1998).

Total value of fishery import trade for the selected Islamic African Arab countries was about 142.62 million U.S. \$ annually, 8.0% only of the value was directed to Islamic countries and 6.3% only of this value was directed to Islamic African countries. ( Table 6 ) . Total value of fishery export trade for this sub-group of countries was about 832.41 million U.S. \$ annually, 3.5% only of the value was directed to Islamic countries and 2.1% only of this value was directed to Islamic African countries.

Total value of fishery import trade for the selected Islamic African non-Arab countries was about 39.87 million U.S. \$ annually, 67.1% of the value was directed to Islamic countries and 66.5% of the value was directed to Islamic African countries (Table 6) . Total value of fishery exports trade for this sub-group of countries was about 3.08 million U.S. \$ only, 3.3% only of this value was directed to Islamic African countries (Table 6) .Generally speaking, for the eight selected countries of the group countries of the study, 21.0% only of the value of their import trade was directed to Islamic countries and about 19.4% only was directed to Islamic African countries. In case of their export trade, 3.5% only of its value was directed to Islamic countries, and about 2.1% only of its value was directed to Islamic African countries (Table 6).

**Table (6):** Direction of Fishery Foreign Trade in Selected Group of Islamic African Countries\*: Arab (5) and Non-Arab (3) as Average Annual Value for The Period (1995-1997). (V = 10<sup>6</sup> US \$)

Countries	Import			Export		
	Total	Islamic Countries	Islamic African Countries	Total	Islamic Countries	Islamic African Countries
<b>Arab</b>						
Egypt	104.90	4.20	3.10	2.90	0.94	0.22
Algeria	16.73	1.67	1.17	3.41	0.17	0.17
Morocco	8.91	0.76	0.72	738.01	27.30	16.54
Sudan	0.16	-	-	0.10	0.05	-
Tunisia	11.92	4.80	3.96	87.99	0.35	0.17
Total	142.62	11.43	8.95	832.41	28.81	17.10
%	100.0	8.00	6.28	100.0	3.46	2.05
<b>Non-Arab</b>						
Cameroon	25.52	15.75	15.50	1.66	0.10	0.10
Chad	0.83	-	-	-	-	-
Gabon	13.52	11.00	11.00	1.42	-	-
Total	39.87	26.75	26.50	3.08	0.10	0.10
%	100.0	67.09	66.47	100.0	3.25	3.25
<b>Islamic African Countries</b>	182.49	38.18	35.45	835.49	28.91	17.20
Total (%)	100.0	20.92	19.43	100.0	3.46	2.06

\* Data on direction of fishery foreign trade (import & export) for the group countries of the study (27) was only available for five Arab countries Viz., Egypt, Algeria, Morocco, Sudan and Tunisia and for three non-Arab countries Viz., Chad, Cameroon and Gabon. (FAO, 1998)

**Source:** Collected and Calculated from: FAO. 1998. Fishery Yearbook Statistics, **Commodities**, Vol.87, Rome, Italy.

## **DISCUSSION AND RECOMMENDATION**

Total fish catch from capture fisheries and aquaculture for Islamic African countries (27) was only 27% of total fish catch from the entire Islamic countries (57), notwithstanding extensive and fertile marine natural resources in Eastern Central Atlantic (34) and Western Indian (5) and extensive inland water resources, as well as capital and human resources in their fishery economies.

Fish catch from inland fisheries for the group countries of study (27) was about 45% of the entire fish catch from inland fisheries in Islamic countries, but the major part of this catch (75%) was attributed by Islamic African non-Arab countries (17) primarily from Uganda, Senegal and Nigeria. Egypt alone from the other sub-group of Arab countries contributed 22% of total inland fish catch from group countries of study (27). These four countries can assist the other group countries of the study to increase fish catch from their extensive inland water resources particularly, Egypt is leading country among the group study countries in stocking and restocking natural fresh and Brackish water resources so as to increase its productivities.

Fish catch from marine resources in Arab and non-Arab group countries of study was equal but rather low constituting only 25% of marine catch in all Islamic countries. Morocco, Egypt, Nigeria, and Senegal are again major countries in marine fish catch. Joint venture agreement between these countries and the remaining group countries of the study is a key factor to fully exploit and increase fish catch from their marine resources through long range fishing activities.

Aquaculture production in the group countries of the study was only 17% of total Islamic countries, it was attributed primarily by Egypt (91%) and Nigeria (7%), the remaining countries attributed 2% only.

Egypt can play major role in pushing aquaculture production in un- exploited water resources by establishing fish cages , race ways and other types of fish farming in these countries so as to increase fish catch and to achieve food security in their countries.

Under the prevailing conditions in base year (2000), fish catch from capture fisheries in Arab countries of the study is expected to raise by the year 2005 by about 10% only, and by about 165% only from aquaculture. As to the case with non-Arab countries, the expected increase in fish catch from capture and aquaculture was found only 25% and 40% respectively.

Accordingly, apparent per-capita fish consumption (from home fisheries) for the group countries of the study is expected to raise by the year 2005 to about 10.1 kg compared to 8.5 kg in (1997-99) period. It will even be far bellow world or LIFDC's levels in the given period of about 15.8 kg and 18.4 kg respectively. In order to attain even the world per-capita consumption in the given period of about 15.8 kg, the group countries of the study has to import fish and fish products in the year 2005 by about 2858.8 thousand m.t. valued at selling prices in the year 2000 by about 1491.8 million U.S. \$ plus extra price inflation.

Arab countries of the study have yielded positive surplus in quantity and value in their fishery trade balance, which is caused primarily by Morocco, Tunisia and Mauritania. Non-Arab countries of the study has yielded on the other hand negative surplus in quantity of their trade balance which was caused mainly by Nigeria, Cameroon, Togo and Guinea. Egypt also suffer from tremendous negative surplus in quantity and value.

Efficiency of fishery foreign trade in group countries of the study was rather moderate or even low. Direction of fishery import and export trade intra the group countries of the study and for the Islamic countries was very modest constituting only

about 21% of total value of their annual import trade and about 3.5% only of total value of their annual export trade.

**According to, the study's result , the following recommendations are given :**

- 1-It is of great necessity to reach joint venture agreements among group countries of the study as a step to strengthen economic and technical cooperation in managing and developing fishery economic resources especially in adjacent countries with common fishery interests .
- 2-Technical potentials of fishing boats and fishing gears in the group countries of the study has to be modernized . Fishery cooperative and social funds societies can play vital role .Training programs to raise human capacity building in fishing techniques and navigation to exploit off shore and distant fisheries particularly , in new fishing grounds in exclusive economic zones ( EEZ ) .
- 3-By catches , trash fishes and discarded fishes has to be minimized in fish landing by adopting effective managing policies and enforcement of fishing laws and FAO regulations .In a study by Research Institute of Agricultural economics in Egypt , about 10 % of fresh fish landing is trash or discarded (Anon. 1996) . Marketing technical efficiency can be enhanced by modernizing means of domestic transport

and chain of cold stores . Swift and effective marketing operation is required particularly in hot climatic conditions in the group countries of the study .

- 4-Egypt , contribute over 90 % of aquaculture production of Arab sub – group countries , it can play prominent role in assisting other group countries of the study to expand aquaculture particularly in land locked countries as Burkina Faso , Mali , Chad .Nigeria can also play prominent role with Egypt in this respect .
- 5- As an leading country in high – seas and deep water marine fisheries , and world major fish exporting country Morocco can assist other group countries in the study adjacent to Atlantic fisheries for better exploiting of their fisheries .
- 6-Uganda and Nigeria can assist as well , non- Arab sub – group countries of the study in developing their inland water fishery resources.
- 7- As developing and as LIFDCS Islamic African countries has to extent its relation with developed countries to gain technical know how in fisheries such as Spain , Russia , Italy , China, Denmark and Norway which expressed its readiness in world fishery conference held in Rome in 1984 to help developing countries in small scale and long range fisheries in bilateral relation as well as FAO guidance .

**APPENDIX**

Population and Per-Capita Fish Consumption in Islamic African countries in the year 2000.

African Arab Countries		
Name	Population (Million)	Per-Capita fish consumption (Kg/man)
Morocco	29.9	20.3
Egypt	67.9	13.7
Comoros	1.0	13.6
Tunisia	10.0	9.5
Libya	5.4	5.8
Mauritania	3.0	4.1
Algeria	30.0	3.6
Somalia	9.4	2.0
Sudan	31.1	1.6
Djibouti	1.0	0.6
<b>Total</b>	<b>188.7</b>	

**Cont.**

**Cont.**

<b>African Non – Arab Countries</b>		
<b>Name</b>	<b>Population (Million)</b>	<b>Per-Capita fish consumption (Kg/man)</b>
Gabon	1.2	43.5
Senegal	9.4	33.7
Gambia	1.3	21.3
Sierra Leon	4.4	15.8
Uganda	22.0	15.5
Guinea	8.2	12.4
Cameroon	14.9	11.1
Chad	8.0	10.5
Togo	4.5	10.3
Mali	11.4	9.9
Nigeria	113.4	9.8
Benin	6.3	5.6
Eritrea	4.0	3.0
Mozambique	18.0	2.7
Guinea Bissau	1.2	1.5
Niger	10.8	1.4
Burkina Faso	11.5	1.1
<b>Total</b>	<b>250.5</b>	
<b>Grand Total</b>	<b>439.2</b>	

**Source:** Collected and Calculated from:

- 1) FAO. 2000 c. Fishery Statistics Yearbook, Aquaculture Production, Vol. 90/2, Rome, Italy.
- 2) Anon. 2003. Inter conf. Of Fish Resources and food Security in Islamic and Arab countries , Al-Azhar University , Cairo , Egypt , 22-24 Oct.;
- 3) FAO. 2000 b Fishery Statistics Yearbook, Catch and Landing, Vol. 90/1, Rome, Italy.
- 4) FAO. 2000 a. Fishery Statistics Yearbook, Commodities, Vol. 90, Rome, Italy.

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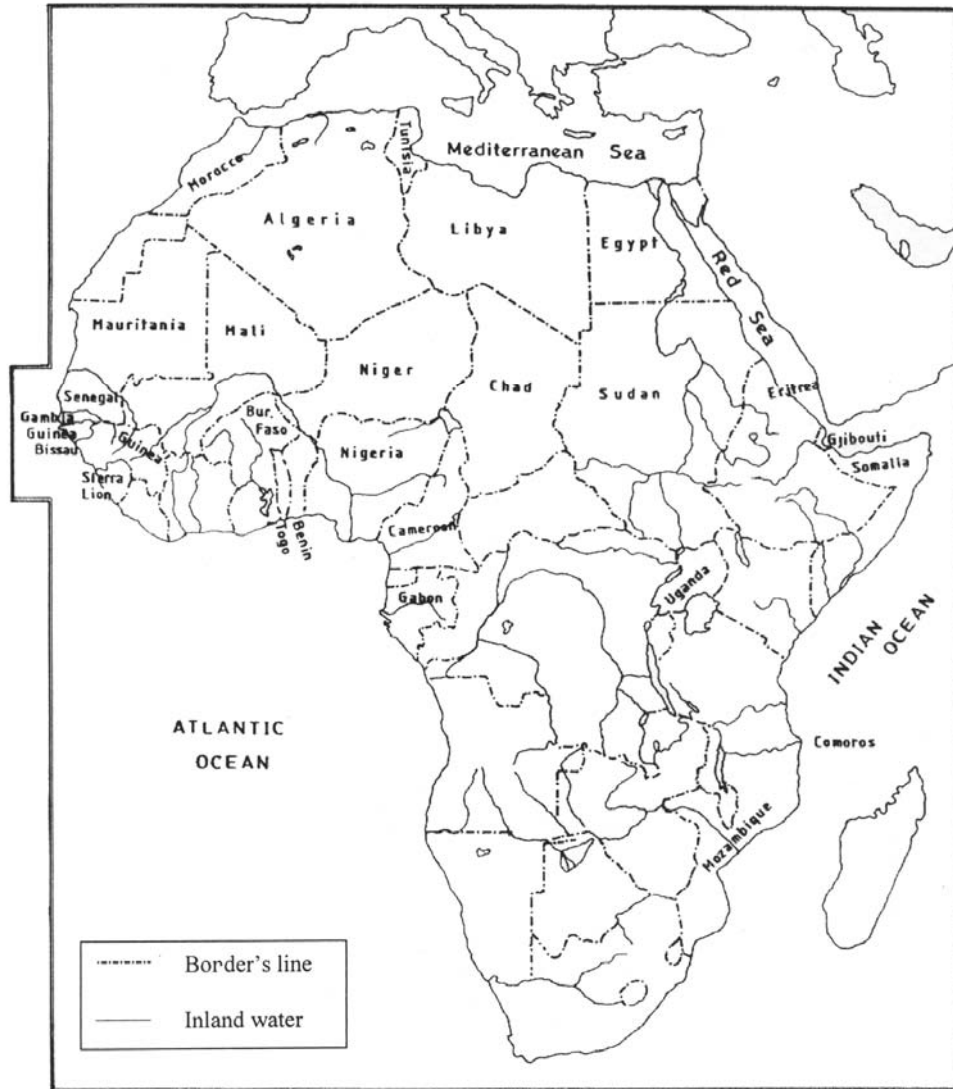


Fig.(1) : Map showing Marine and Inland water in Islamic African countries(Anon.1)