



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



An overview of fish production sector and scientific efforts in Egypt

Presented by:

Dr. Ahmed Ismail Mehrim

E. mail: amehrim2002@yahoo.com

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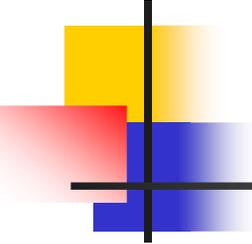
آليات ومحاور تنمية الثروة السمكية فى مصر

كلية الزراعة – جامعة المنصورة

المنصورة - مصر

19 / 12 / 2011





Presentation outline:



- **Historical view of aquaculture systems in Egypt.**
- **Water resources in Egypt.**
- **Facts about fish production in Egypt.**
- **Challenges of fish production in Egypt.**
- **Scientific efforts in fish production sector.**
- **Recommendations.**

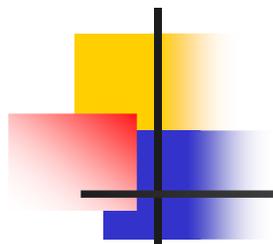
Historical view of aquaculture in Egypt

- Painting on the tombs of Pharaohs back to 2500 B.C. show fish in manmade ponds.
 - Probably tilapia
 - Indicates some form of fish culture
- Egyptians probably raised fish for decoration or fun not as food to feed families.





- Modern aquaculture began in the mid 1930s following the introduction of the common carp at two research farms, from then until the early 1960s.
- The first modern semi-intensive commercial farm was built by the Government in 1961. This farm had a total area of 120 hectares of earthen ponds.
- In the late 1970s an aquaculture development plan was proposed. In the mid 1980s, annual aquaculture production had jumped from 17 000 tonnes to 45 000 tonnes.



Development of aquaculture systems **in Egypt.**

At the beginning

Extensive system:

- In the mid 1980s.
- Large shallow ponds of up to 57.5 feddan.
- Production per unit area was low (109 – 174 kg / feddan).

Semi-intensive system:

- Commercial farm was built by the Government in 1961s.
- Practiced in smaller ponds of between 5 – 14 feddan.
- Production from this system was in the range of 0.7 – 1 tonnes per feddan.

Recently state in 2009

Extensive system:

- **Unknown data.**

Semi-intensive system:

- Ponds are large (between 5 – 18 feddan).
- Annual production between **1.2 to 3.5 tonnes per feddan.**
- Total production of **597 881 tonnes**, (**86%** from total fish production).

At the beginning

Recently state in 2009

Intensive pond system:

- In the mid 1990s.
- Smaller and deeper ponds.
- Average annual production attained is in the range of 7.6 – 13 tonnes per feddan.

Intensive pond system:

- Smaller in size (0.7 to 1.4 feddan) with higher water depths to reach 1.5–1.75 meters.
- Total production from intensive pond systems was **1860 tonnes**, (**0.27%** from total fish production).
- Average production per feddan of **6 – 11 tonnes**.

Intensive aquaculture in concrete tanks:

- Total number of registered farms is currently **530**.
- Annual production of **6300 tonnes**.

Intensive fish farming using tanks:

- **Five farms** with a total production of **500 tonnes** per year.

At the beginning

Recently state in 2009

Integrated desert agriculture-aquaculture:

- Started in the late 1990s.
- Expanding rapidly particularly in the western desert region.

Integrated desert agriculture-aquaculture:

- A large number of desert land owners have established.
- A production of **1030 tonnes** has been reported.

Poly-culture in rice:

- Began in the **1984s**.

Poly-culture in rice:

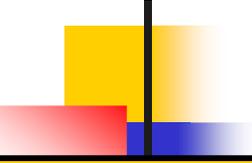
- Total production was **26012 tonnes**.

Cage culture:

- Began in the **1984s**.

Cage culture:

- More than **4500 cages** with a total volume of **1.4 million cubic meters**.
- Total production from cage culture was **68049 tonnes**.



At the beginning

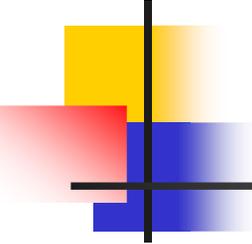
Marine aquaculture:

- Began in the late 1980s and early 1990s.

Recently state in 2009

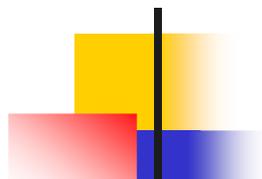
Marine aquaculture:

- Total production was **13,194 tonnes**.



Water resources in Egypt

Lengths (km) /Area (km²) of capture (2009)

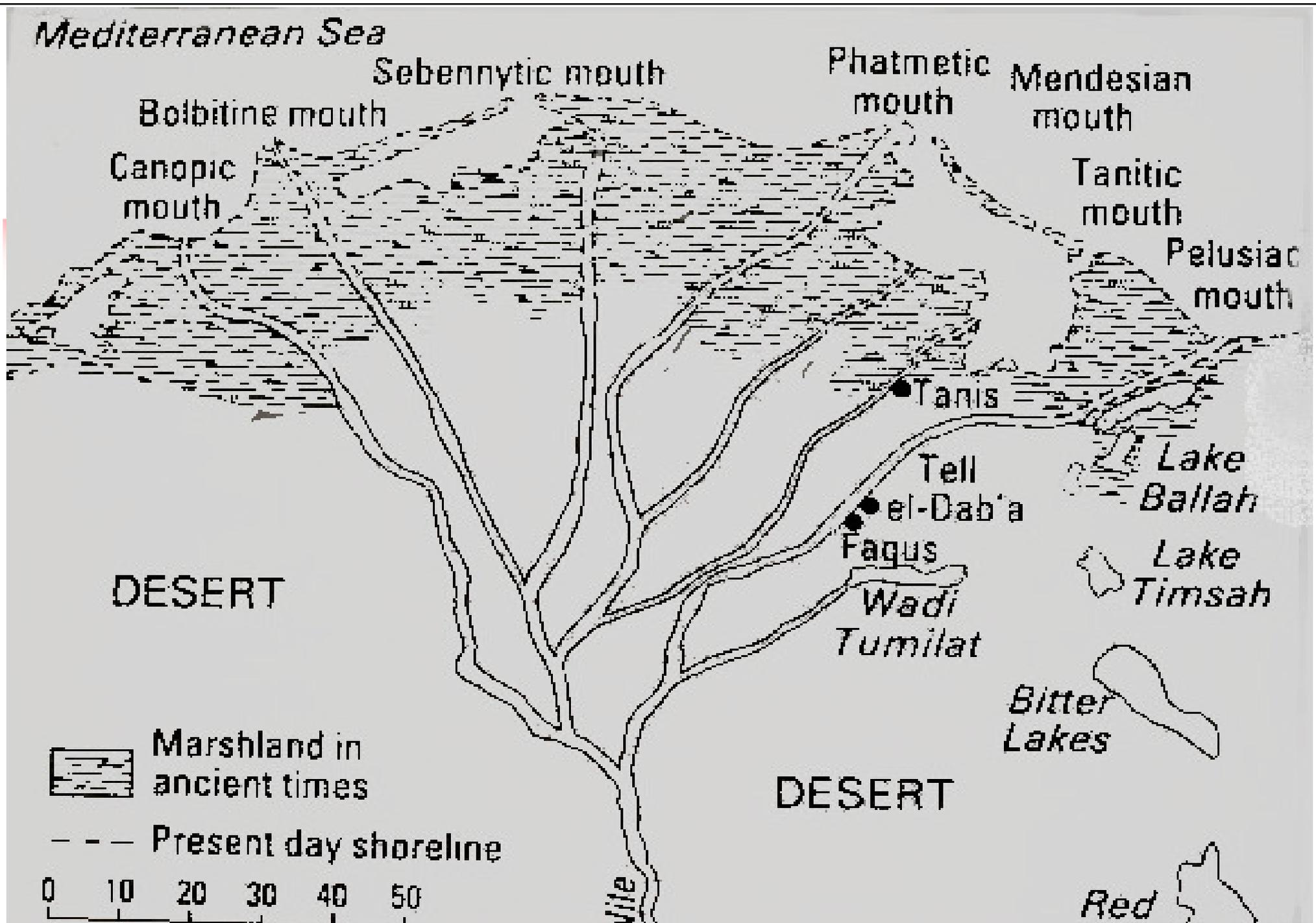


Marine water	Shelf area	Brackish water	Freshwater
2,665	87,120	1,205,400	756,005

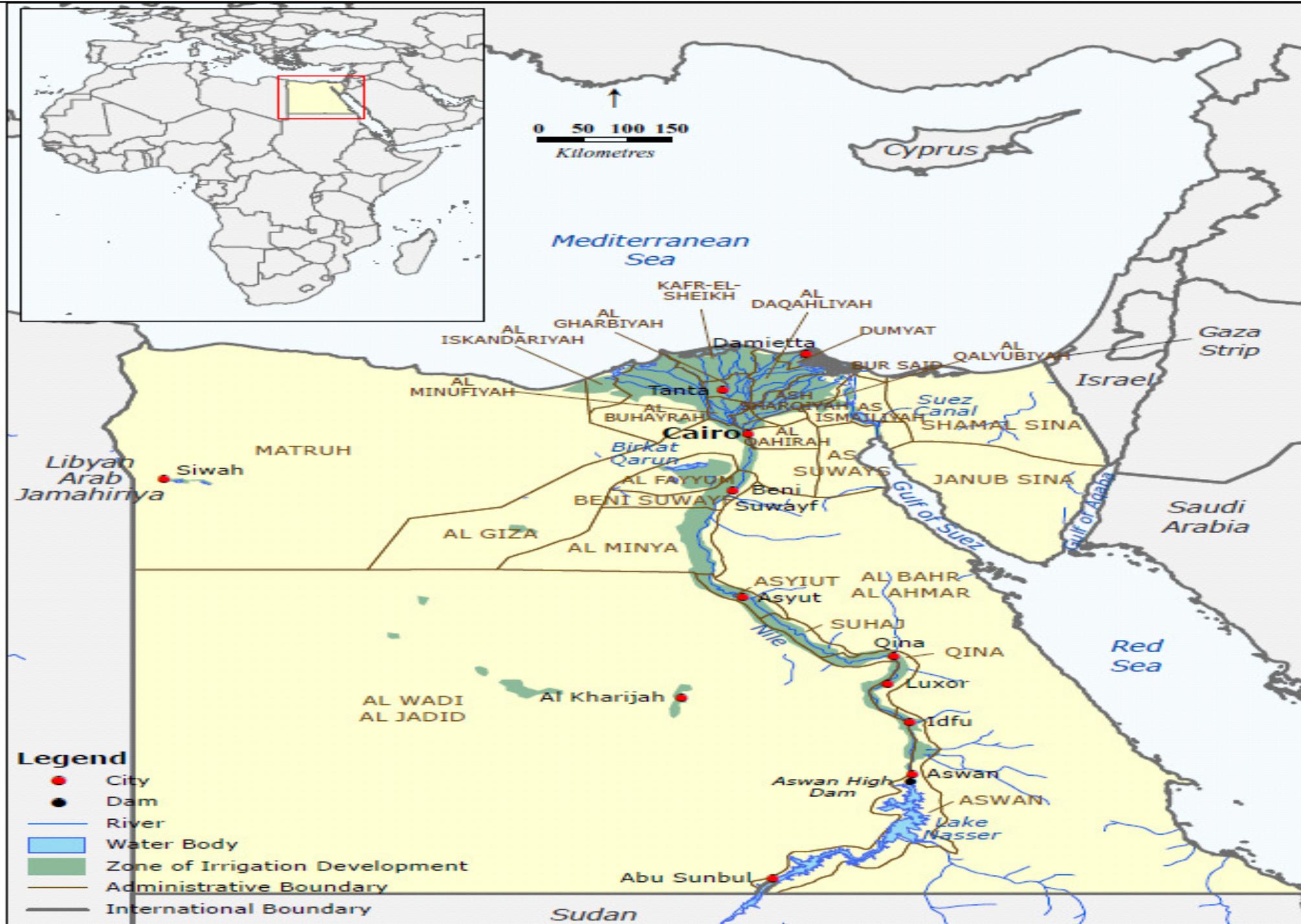
Area (feddan or m³) of aquaculture (2009)

Intensive (m ³)	Rice-fish culture (feddan)	Floating cages (m ³)	Governmental and private farms (feddan)
300,400	37,700	5,171,418	361,326

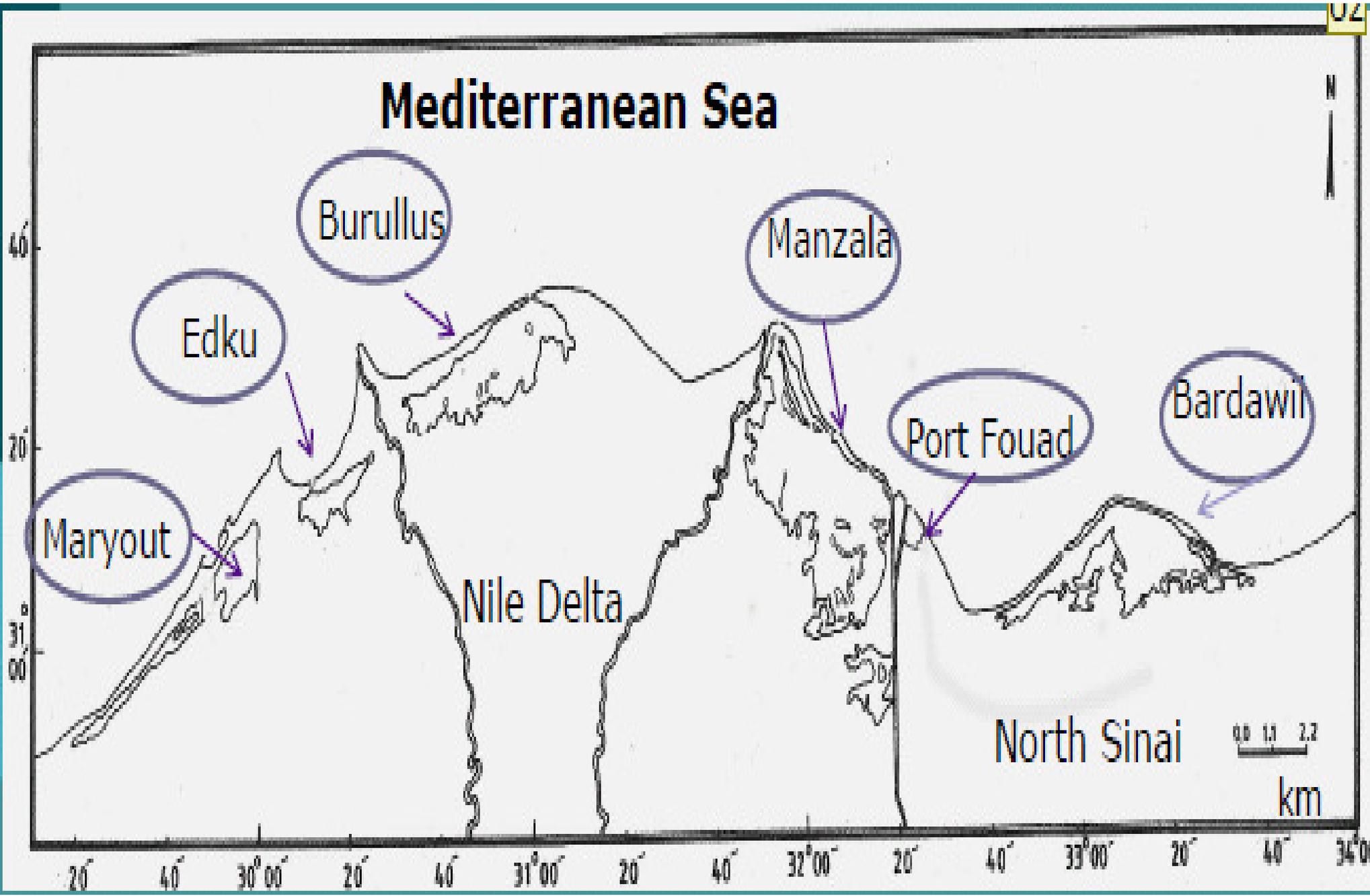
Source: Arab Fishery Statistic Yearbook Vol. (4), (2010)

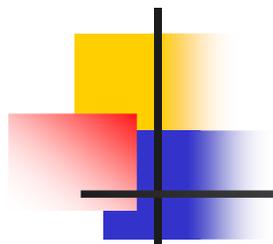


Map showing ancient Nile branches



Number and distribution of coastal lagoons in Egypt

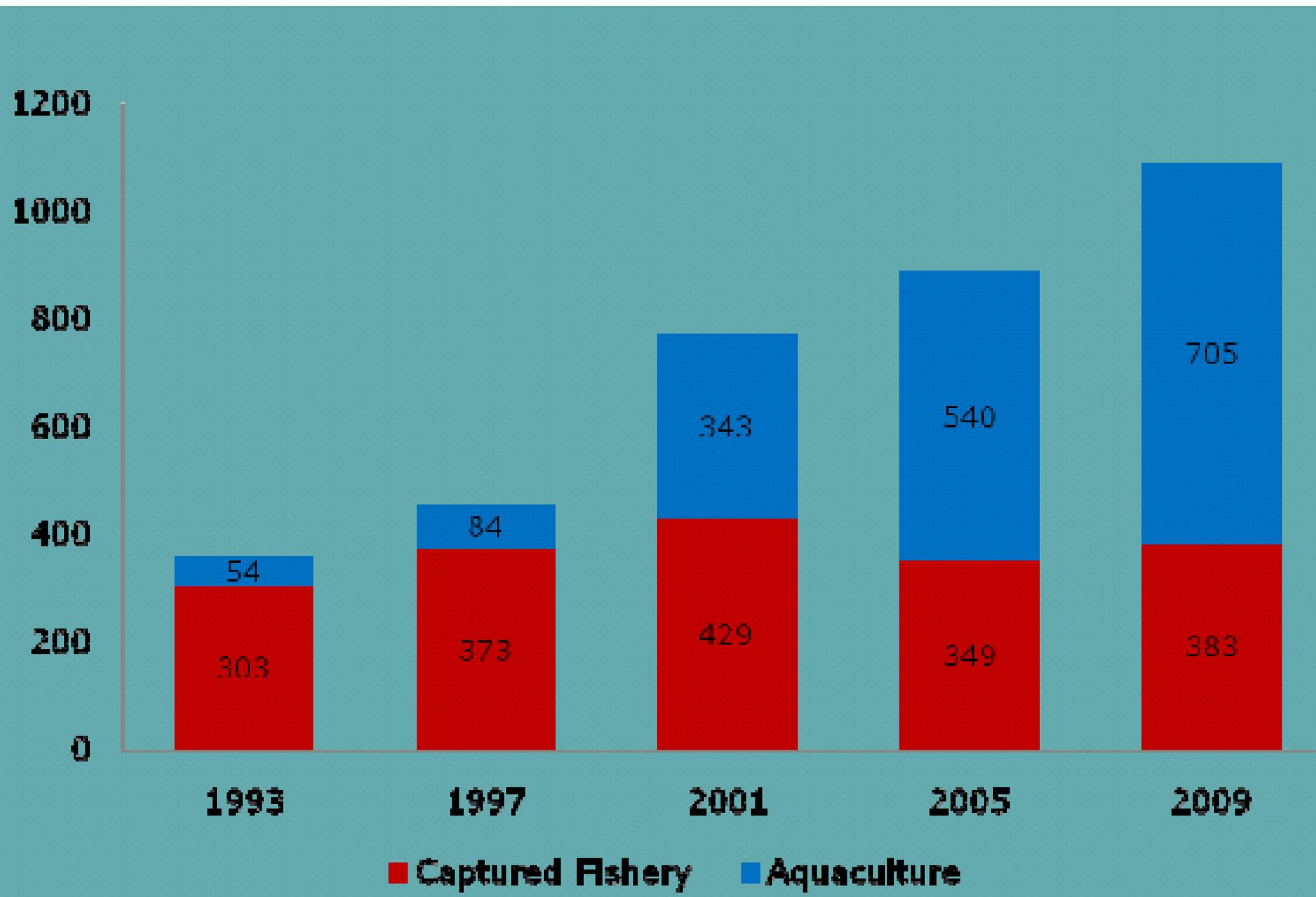




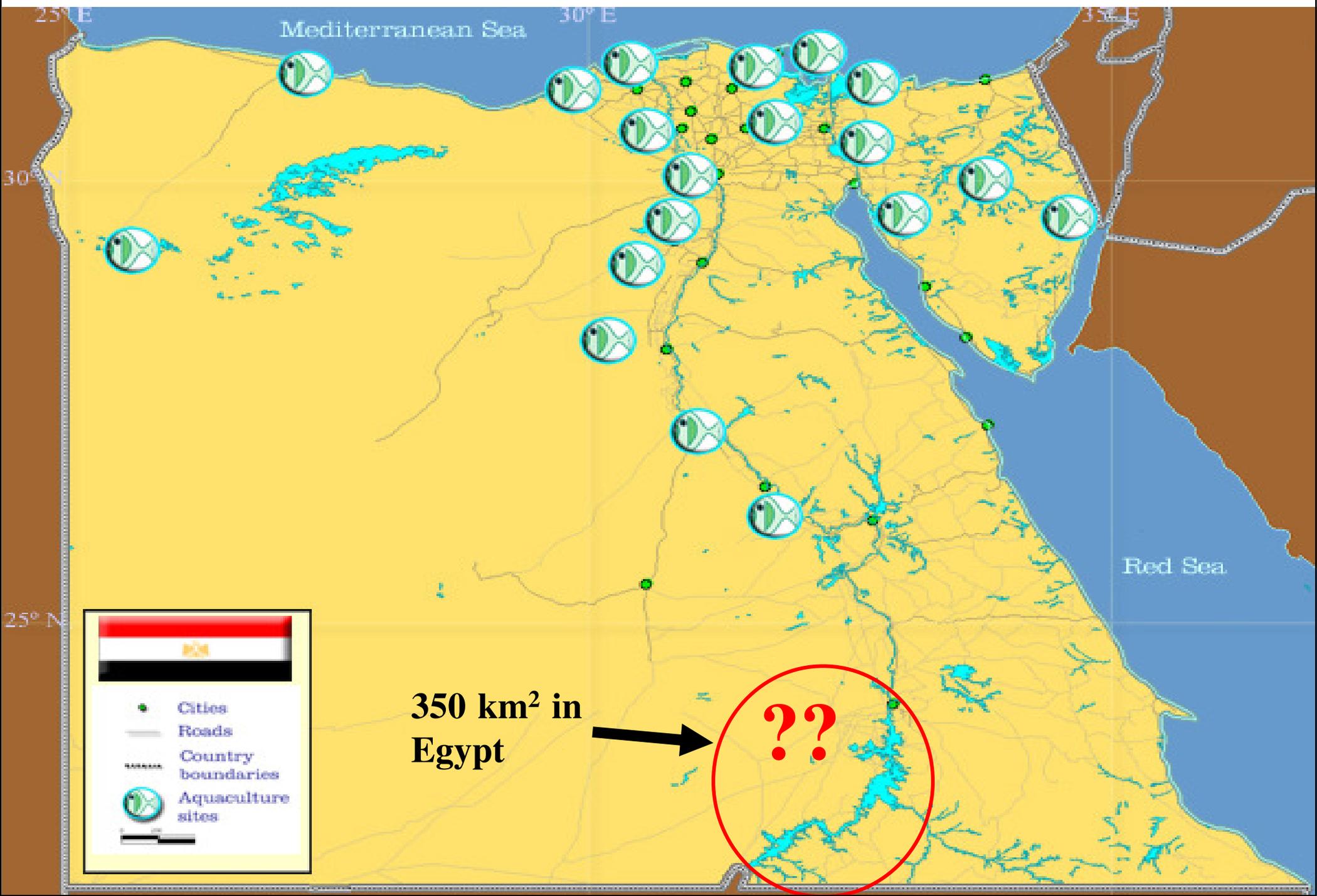
Facts of fish production in Egypt

- **Aquaculture in Egypt** has witnessed a significant and rapid expansion over the last few years.
- **Today Egypt** has the largest aquaculture industry in Africa and aquaculture is accounting for almost **65%** of the total fish production in **2009** with over **99%** produced from small and medium-scale privately owned farms.
- Market value of annual aquaculture production amounts to over **USD 1.3 billion**.

Fish production in Egypt by sector from 1993 to 2009 (tonnes x 10³)



Distribution of the main aquaculture production sites (Google Egypt map, 2010).



350 km² in
Egypt



Numbers of fishermen, fishing ports and landing berths in **Egypt** (2009)

No. of Fishermen		Fishing ports	Landing berths
Use boat	Without boat		
33,418	3656	6	201

Source: Arab Fishery Statistic Yearbook Vol. (4), (2010)

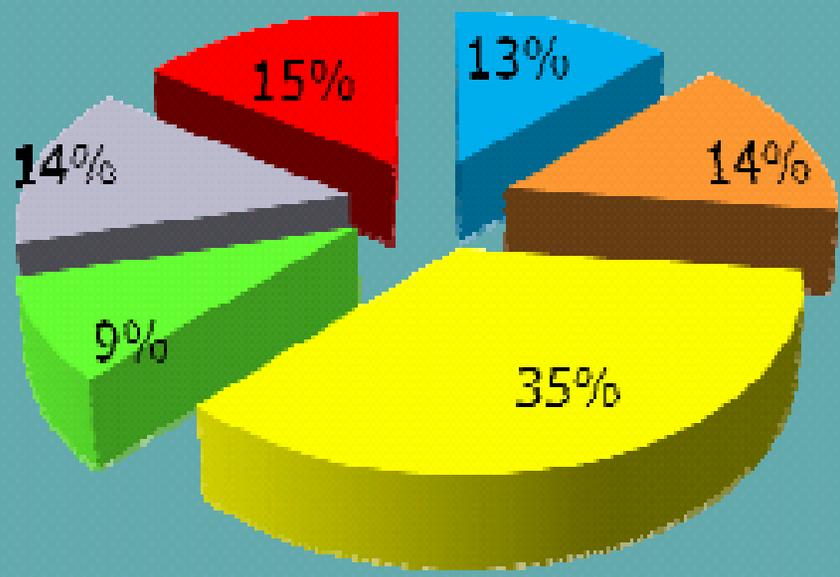
Fish production in Egypt from 1993 to 2009 (tonnes x 10³)

	1993	1997	2001	2005	2009	1993/ 2009
<i>Sea Fisheries</i>						
• Mediterranean	44.7	52.7	59.6	56.7	78.8	1.76
• Red Sea	50.9	57.1	73.5	50.7	49.0	0.96
<i>Coastal lagoons</i>						
• Maryout	3.7	4.5	6.2	5.3	5.5	
• Edku	8.3	10.8	10.9	9.6	6.2	
• Burullus	48.0	58.7	59.2	53.9	53.4	
• Manzala	63.6	63.1	68.4	40.0	48.0	
• Port Fouad	0.2	0.2	0.2	0.2	0.2	
• Bardawil	2.2	2.2	3.1	3.5	5.4	
	126.4	139.5	148.0	112.5	118.9	0.94
<i>Inland lakes</i>	31.2	56.1	37.4	45.9	47.2	1.51
<i>River Nile & canals</i>	50.0	65.5	110.1	83.8	87.3	1.75
<i>Fish farming</i>	54.0	83.8	342.9	539.7	705.0	12.74
<i>Total fish production</i>	356.7	457.0	771.5	889.0	1070	

Fish production in Egypt by sector from 1993 to 2009 (tonnes x 10³)

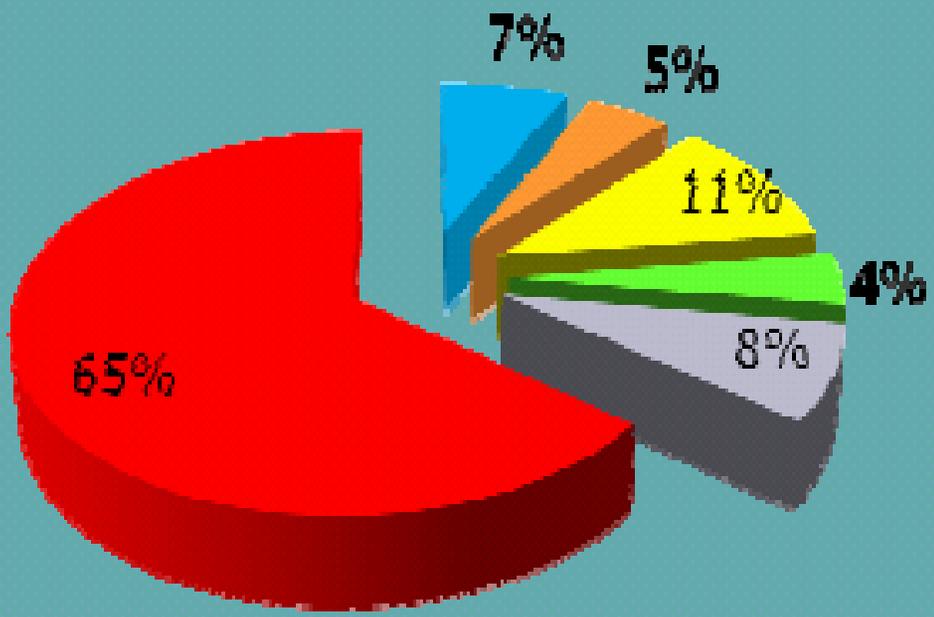
1993

- Mediterranean
- Red Sea
- Costal lagoons
- Inland lakes
- River Nile
- Fish Culture

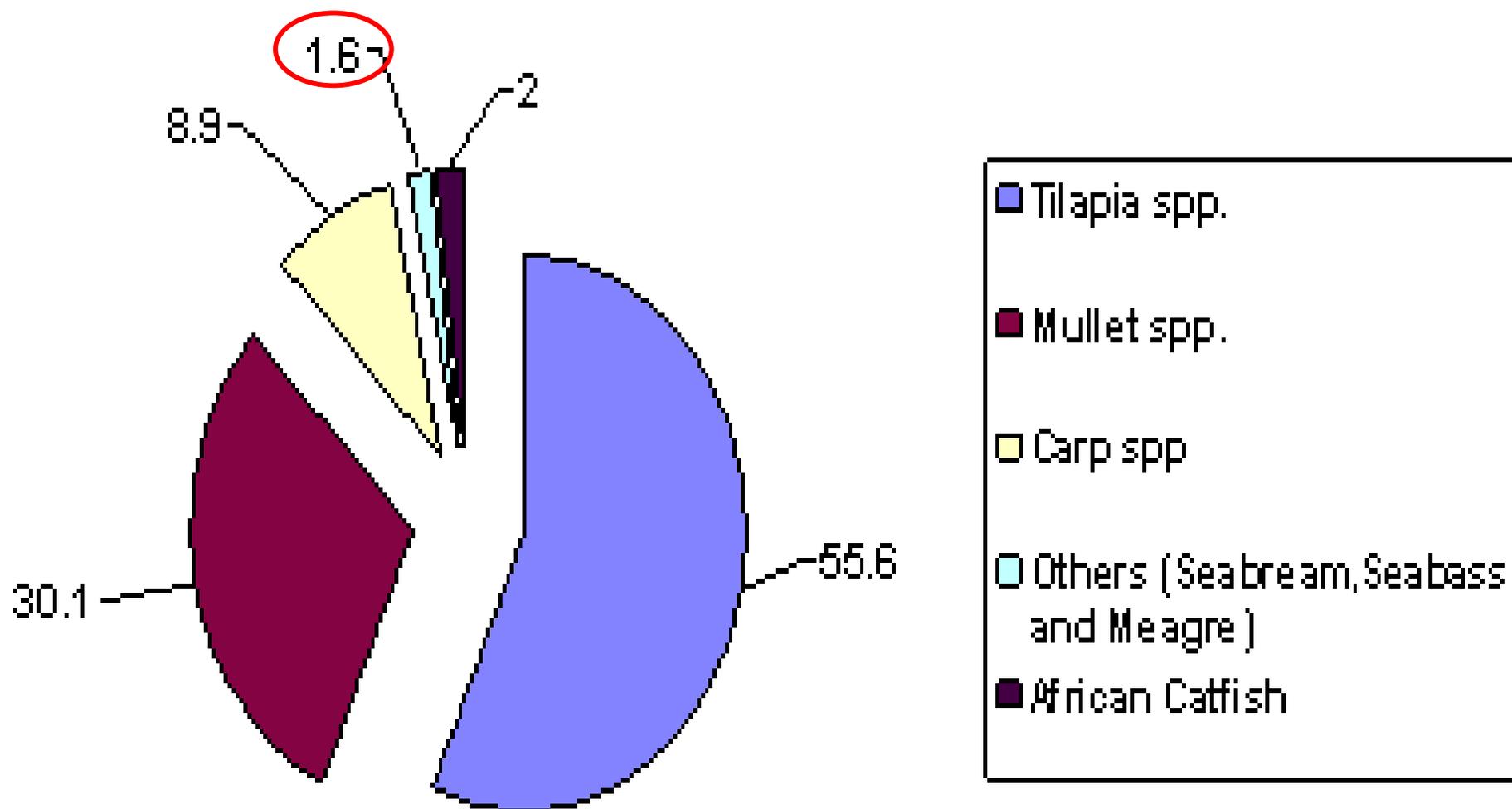


2009

- Mediterranean
- Red Sea
- Costal lagoons
- Inland lakes
- River Nile
- Fish culture



Egyptian aquaculture production ranking percent per fish species in 2008 (GAFRD, 2009)

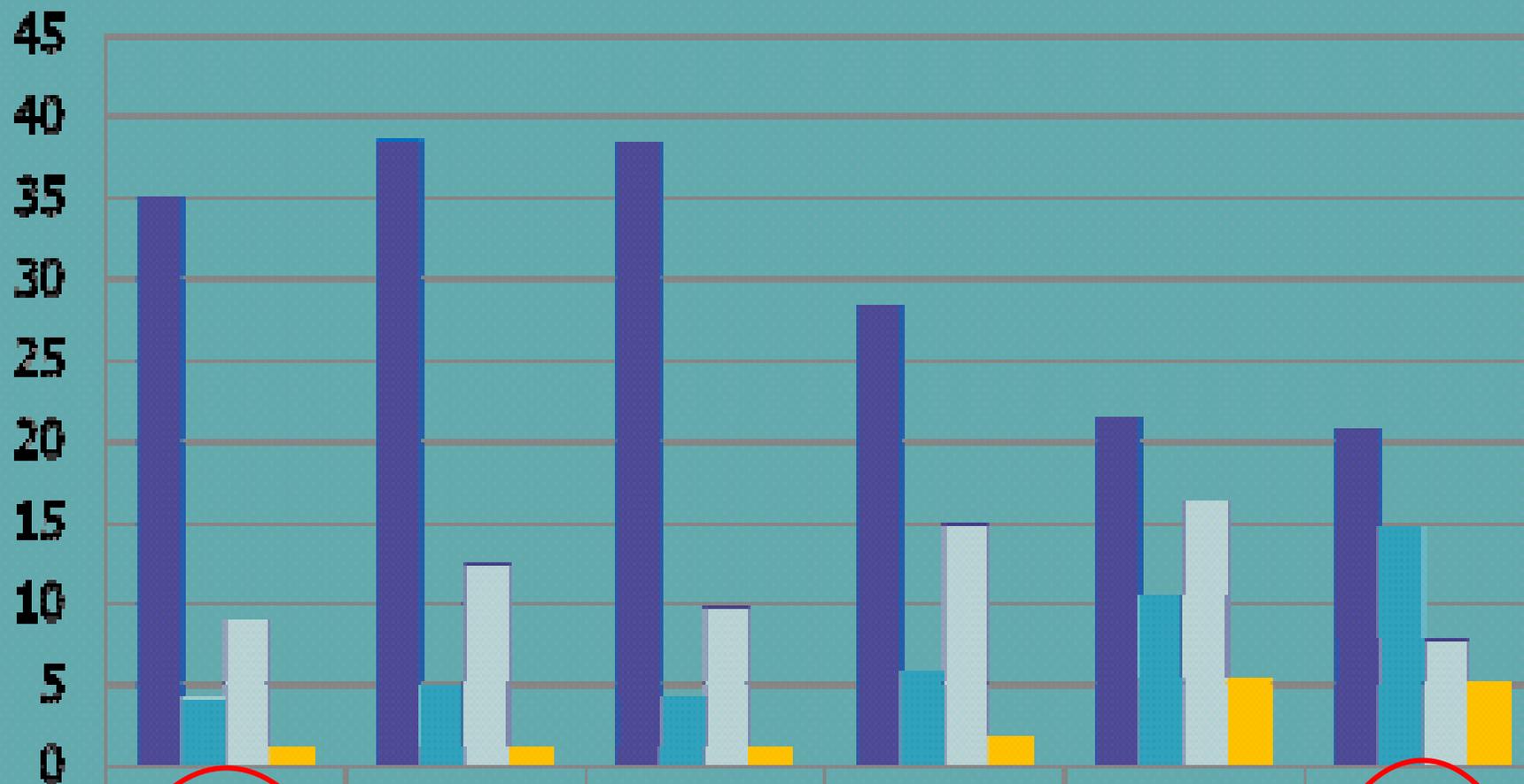


Fish catch from **Bardawil Lagoon** (tonnes) from 1999 - 2009



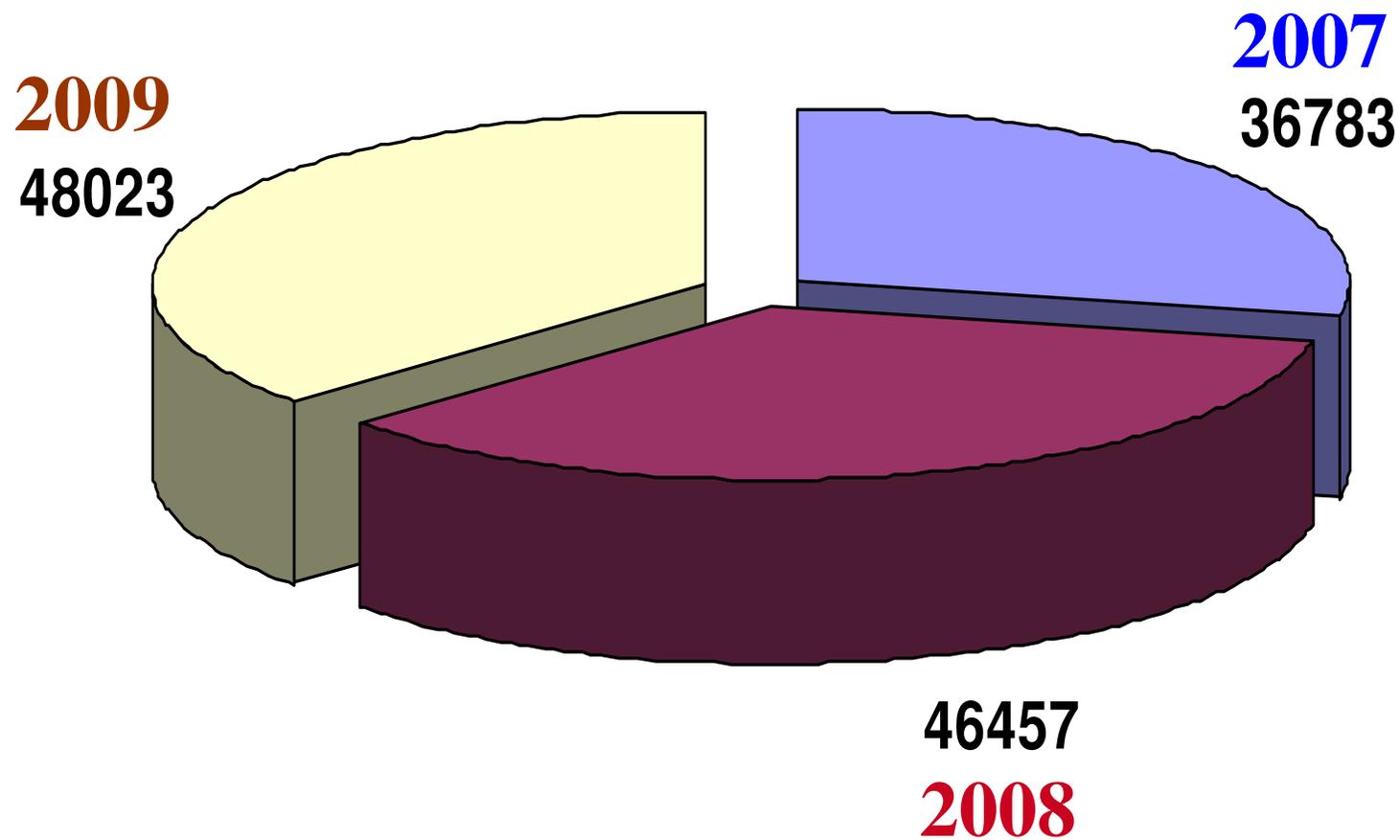
	1999	2001	2003	2005	2007	2009
marine fish	607	617	603	684	865	867
Mullets	1062	975	1165	753	952	1104
Crustaceans	1550	1554	1523	2097	2912	3439

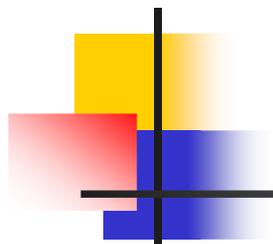
Fish catch from **Burullus Lake** (tonnes) from 1999 - 2009



Tilapia	35	38.5	38.4	28.3	21.35	20.7
Other Freshwater	4.1	4.9	4.3	5.8	10.5	14.8
Mullet	8.9	12.3	9.7	14.9	16.3	7.7
Marine Fishes	1.2	1	1.1	1.8	5.2	5.1

Fish Production (ton) of Lake Manzala in Egypt during 2007 - 2009





**Production of Fishery
Resources in Egypt during
2007 - 2009**

Resource	Fish production (ton)		
	2007	2008	2009
Capture fishery			
Mediterranean Sea	83762	88882	78790
Red Sea	46986	47361	49031
Lake Maryut	4413	4352	5518
Lake Edku	6645	5891	6206
Lake Burolls	58291	52260	53401
Lake Manzala	36783	46457	48023
Port Fouad Lagoon	321	128	185
Bardawil Lagoon	4729	5394	5410
Lake Timsah	4788	4863	4557
Lake Qarun	3072	3184	3400
Rayaan Depressions	2126	2055	2624
Nile Valley Project	482	403	452
Lake Nasser	19592	29713	37657
Toshky Depression	2791	3184	4809
River Nile and branches	97710	79688	87335
Total of capture fishery	372491	373815	387398

	Aquaculture		
	2007	2008	2009
Governmental farms	8539	8547	6605
Private sector farms	557822	586435	591276
Intensive aquaculture	1580	1825	1860
Floating cages	62276	69108	68049
Rice-fish aquaculture	5300	27900	37700
Total Aquaculture	635517	693815	705490
Grand total	1008008	1067630	1092888

Source: GAFRD, Fishery Statistics Year Books. **Source:** GAFRD, 2010, Year Book

Capture production (M.T.) in Egypt (2007-2009)

Marine water *			Freshwater			Brackish water		
2007	2008	2009	2007	2008	2009	2007	2008	2009
140586	146628	137973 ↓	120575	112988	130253 ↑	111330	114199	119172 ↑

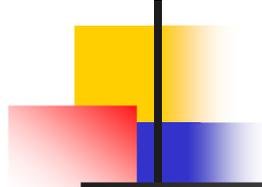
* Fisheries are the Mediterranean (6.8) and Red Sea (4.4) with total area of this fishery **11.2 million** acres.

Aquaculture production (M.T.) in Egypt (2007-2009)

Marine water			Freshwater			Brackish water		
2007	2008	2009	2007	2008	2009	2007	2008	2009
409	63945.6	122015 ↑	68792	99020	108000 ↑	566369	530854	475475 ↓

Source: Arab Fishery Statistic Yearbook Vol. (4), (2010)

Fingerlings Production (1000 unit) in Egypt (2007 – 2009)



Marine water			Inland water		
2007	2008	2009	2007	2008	2009
3686	14565	25405 ↑	302614	332748	279338 ↓

The number of fish hatcheries has increased from 14 in 1998 to 350 in 2009 (GAFRD, 2010).

Fish Exports of Egypt (2007- 2009)

2007		2008		2009	
Q	V	Q	V	Q	V
4.42	4.54	6.37	11.18	7.75 [↑]	13.74 [↑]

Fish Imports of Egypt (2007- 2009)

2007		2008		2009	
Q	V	Q	V	Q	V
258.76	219.23	167.86	372.08	167.79 [↓]	469.81 [↑]

Q=Quantity (M.T.)

V=Value (Million U.S. Dollar)

Source: Arab Fishery Statistic Yearbook Vol. (4), (2010)

Available for consumption of fish products in Egypt (2007 – 2009)

Year	Production (M.T.)	Exports (M.T.)	Imports (M.T.)	Av. for consumption (ton)	Av. per capita (kg)
2007	1008.06	4.42	258.76	1262.40	16.98
2008	1067.63	6.37	167.86	1229.12	15.95
2009	1092.89 ↑	7.75 ↑	167.79 ↓	1252.93 ↑	15.66 ↓

Source: Arab Fishery Statistic Yearbook Vol. (4), (2010)

Capture fishery production in Egypt at 2009:

Resource	Area	Fish production (ton)	% of total fish production
Mediterranean Sea	900 Km	78790	7.4
Red Sea	1000 Km	49031	4.6
Lake Maryut	59.5 * 10 ³ feddan	5518	0.5
Lake Edku	500 feddan	6206	0.6
Lake Burolls	109.5 * 10 ³ feddan	53401	5.0
Lake Manzala	100 * 10 ³ feddan	48023	4.5
Bardawil Lagoon	165 * 10 ³ feddan	5410	0.5
Lake Qarun	55 * 10 ³ feddan	3400	0.3
Lake Nasser	350 Km ²	37657	3.5
River Nile and branches	180 * 10 ³ feddan	87335	8.2

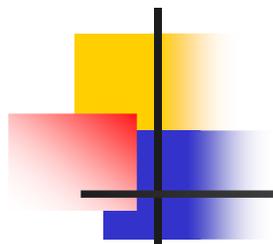
Aquaculture production in Egypt at 2009:

Resource	Area	Fish production (ton)	% total fish production
Governmental farms	6134 feddan***	6605	0.6
Private sector farms	343,593 feddan	591,276	55.4
Semi-intensive farms*	366.16*10 ³ feddan	597,881	86.0
Intensive aquaculture**	45.77*10 ³ feddan	1860	0.27
Cages	1.4 million cubic meter	68,049	6.4
Poly-culture in rice paddy	37.7*10 ³ feddan	26,012	2.4
Marine aquaculture	unknown	13,194	1.2

*Annual production per feddan between 1.2 to 3.5 tonnes ???

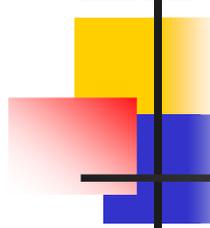
**Average production per feddan of 6.0 – 10.8 tonnes ?

Source: GAFRD, 2010: Fishery Statistics Year Books.



Challenges of fish production in Egypt

- **Pollution (water & feedstuffs).**
- **Environmental impacts of aquaculture:**



Aquaculture expansion.

Land reclamation.

Destruction of natural resources.

Fry collection.

Live fish used as food for cultured fish.

Using of hormones and other chemicals.

Release of nutrients and eutrophication.

Social impacts on livelihood of fishermen.

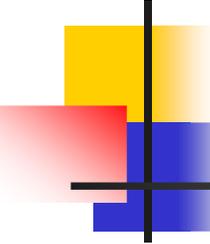
- **Shortage in Fish fry:** (Marine fish).

The number of fish hatcheries has increased from **14** in **1998** to **350** in **2009** (GAFRD, 2009).

- **Expensive & unsuitable fish diets:**

More than **16** fish feed manufacturing companies have been established during the course of the **last ten years** (GAFRD, 2009).

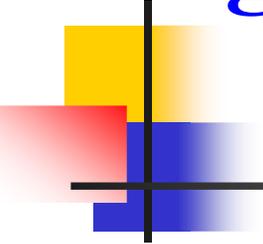
- **Fish cages:** (Freshwater & Marine water).
- **Heavy over-fishing:**



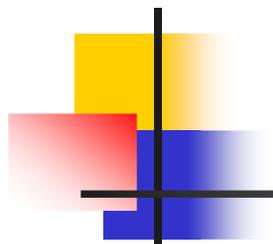
Legislation

- **Law No 48/1982** concerning **pollution protection** of the Nile River and the water channels.
- **Law No 124/1983** on **fishing**, aquatic life and the regulation of fish farms.
- **Law No 4/1994** concerning the **environment**.
- **Law No 8/1997** on **investment guarantees and incentives**.
- Ministerial Resolution 1909/2001.
- Ministerial Resolution 2397/2002.
- Ministerial Resolution 63/2002.

Legislation access to land and water

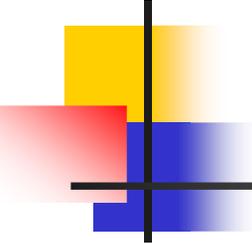


- According to **Law No 124/1983**, only brackish and marine water, and infertile land that is not suitable for agriculture, can be used in aquaculture. Water supply should be restricted to water from lakes and drains, and **the use of fresh (i.e. irrigation) water is prohibited**, although hatcheries established by the government are exempted from this rule.



Scientific efforts in fish production sector

- **Fish nutrition and feeding.**
- **Contamination of feeds.**
- **Fish reproduction.**
- **Improving production efficiency.**
- **Water pollution.**
- **Aquaculture biotechnology:**
 - ** **Ancient biotechnology**
 - ** **Classical biotechnology**
 - ** **Modern biotechnology**



Fish nutrition and feeding

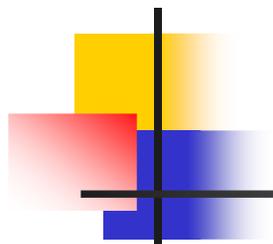


EVALUATION OF USING JOJOBA MEAL
(Simmondsia chinensis)
SUPPLEMENTED WITH METHIONINE
AND BIOGEN® INSTEAD OF FISH
MEAL IN THE DIET OF MONO-SEX NILE
TILAPIA *(Oreochromis niloticus)*

Egyptian J. Nutrition and Feeds (2009) 12
★ (1):141-156 ★

By

F.F. Khalil, F.H. Farrag
and **A.I. Mehrim**



Contamination of feeds



Protective effect of antioxidant
medicinal herbs, Rosemary
and Parsley, on subacute
aflatoxicosis in *Oreochromis
niloticus*

Journal of Fisheries and Aquatic Science,
★ 2009 Vol. 4 (4): 178-190 ★

By:
Manal I. El-Barbary and **Ahmed I. Mehrim**

USING *MAJORANA HORTENSIS* AGAINST CONTAMINATION OF MONO-SEX NILE TILAPIA *OREOCHROMIS NILOTICUS* DIET BY LEAD OXIDE

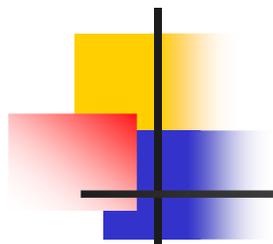
☆ Abbassa International Journal for ☆
Aquaculture, ISSN 1687-7683, Special Issue
for Global Fisheries & Aquaculture Research
Conference, Cairo International Convention
Center, 24 – 26 October 2009, pp 407- 428

By Khalil, F.F. , F.H. Farrag
and **A.I. Mehrim**

REDUCTION OF LEAD OXIDE TOXICITY BY USING BENTONITE IN MONO-SEX NILE TILAPIA *OREOCHROMIS NILOTICUS* DIETS

★ Abbassa International Journal for ★
Aquaculture, ISSN 1687-7683, Special Issue
for Global Fisheries & Aquaculture Research
Conference, Cairo International Convention
Center, 24 – 26 October 2009, pp 429- 451.

By Farrag, F.H., F.F. Khalil and
A.I. Mehrim



Fish reproduction



ALL-MALE MONOSEX NILE TILAPIA (*OREOCHROMIS NILOTICUS*), PROS AND CONS

Egypt. J. Basic Appl. Physiol.,
★ 2009, 8: 41- 57 ★

By

Abdelhamid, A. M.;

A. I. Mehrim,

M. F. I. Salem and H. A. E. Yosuf

AN ATTEMPT TO IMPROVE THE REPRODUCTIVE EFFICIENCY OF NILE TILAPIA BROOD STOCK FISH

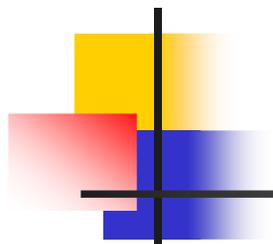
Fish Physiol Biochem., (2010), Vol. 36
(4):1097-1104. (DOI: 10.1007/s10695-010-
9387-6).

By

Abdelhamid, M. A.,

A. I. Mehrim,

M. I. El-Barbary and M. A. El-Sharawy



Improving production efficiency



Effect of Dietary Supplementation of Biogen[®] (Commercial Probiotic) on Mono-sex Nile tilapia *Oreochromis niloticus* Under Different Stocking Densities

Journal of Fisheries and Aquatic Science,
☆ 2009 Vol. 4 (6): 261-273. ☆

By A.I. Mehrim

**IMPROVING THE SURVIVAL RATE
OF AFRICAN CATFISH, *Clarias
gariepinus***

**Abdelhamid, A. M.; I. A. Radwan; A. I. Mehrim and A. F.
B. Abdelhamid**

***J. Animal and Poultry Production, Mansoura Univ.,
Vol. 1 (9): 409 - 414, 2010***

Cannibalism process by African catfish Jumpers



AN ASSESSMENT STUDY OF TILAPIA POLY CULTURE IN FLOATING NET CAGES

**Khalil, F.F.; A. I. Mehrim; A.A. El-Shebly
and M.E.A. Abdelaal**

***J. Animal and Poultry Prod., Mansoura Univ., Vol. 2
(5): 75 - 92, 2011***

Site No.1

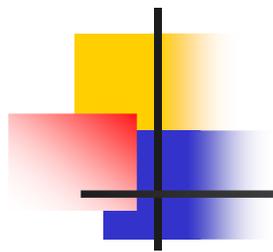


Site No.2



Site No.3



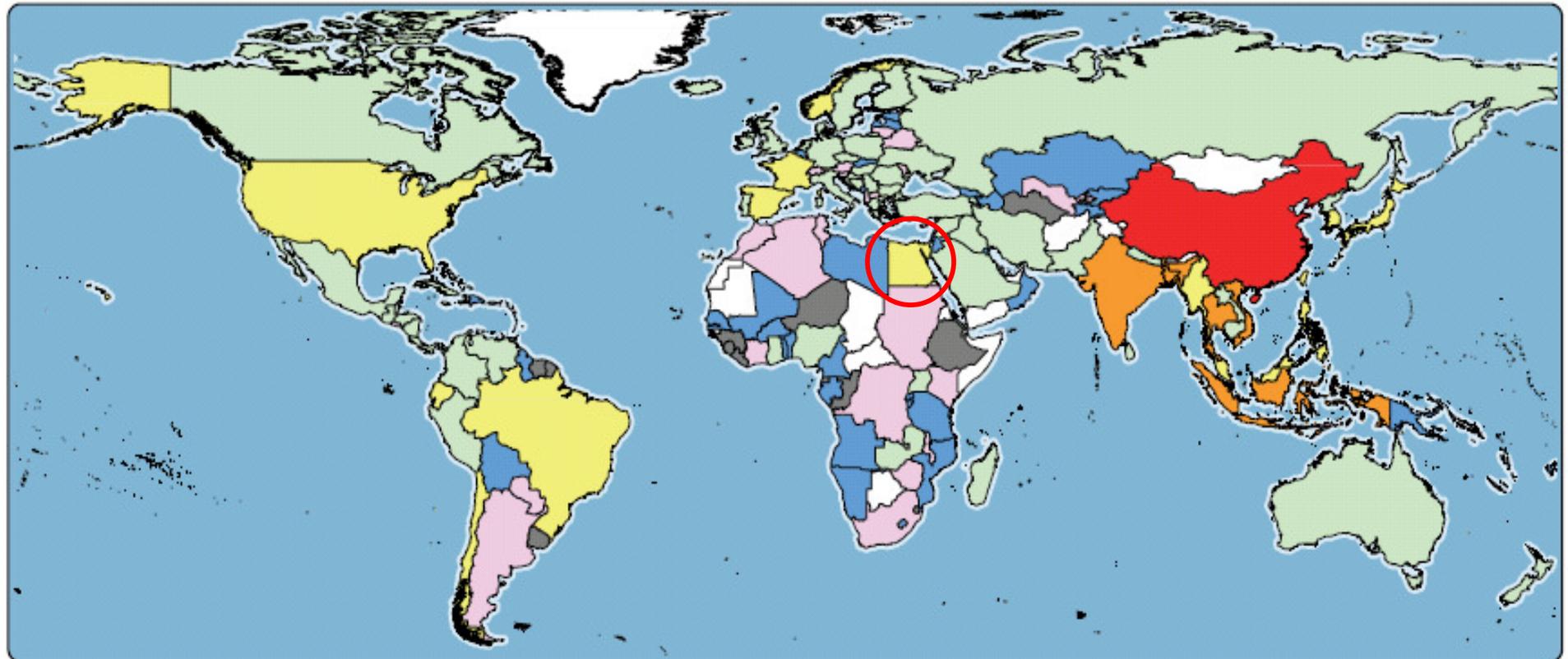


Recommendations

- **Aquaculture** is considered to be the only possible solution to increase fish production in **Egypt**.
- In its development strategy, **the Ministry of Agriculture and Land Reclamation**, plans to increase Egypt's total fish production to **1.5 million tonnes by 2017** and is targeting a harvest of **1 million tonnes from aquaculture**.
- **Integrated aquaculture and agriculture in the desert.**
- **Fish cages.**
- **Marine aquaculture.**

Aquaculture production of aquatic animals for human consumption (tonnes)

2009

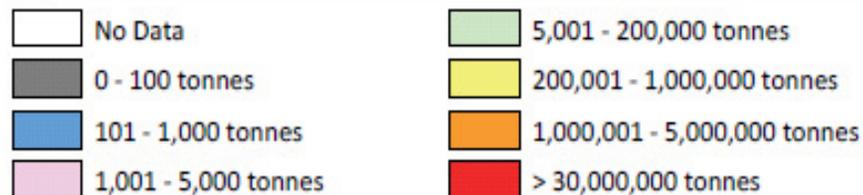


Source: FAO-FI (www.fao.org/fishery)

Data on aquaculture production of aquatic plants worldwide are not included in this map.

Global production of aquatic animals for human consumption from aquaculture continued to grow substantially in the past decade, reaching the annual production level of 55.7 million tonnes in 2009 from 32.4 million tonnes in 2000. Aquaculture has been the fastest-growing animal food producing sector. Aquaculture contributed nearly half (47.3 percent) of the world's food fish consumption, up from 33.8 percent in 2000. With stagnating global capture fishery production and an increasing population, aquaculture is perceived as having the greatest potential to produce more fish in the future to meet the growing demand for safe and quality aquatic food.

Aquaculture Production



The designations employed and the presentation of material in the map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

The underlying data used to create this map was derived from World Aquaculture Production (Quantities and values) Dataset 1985-2009, released in March 2011 by Statistics and Information Service, Fisheries and Aquaculture Department, Food and Agriculture Organization of the United Nations (FAO). The data in their format used here were extracted from the Dataset using FishStat Plus - Universal software for fishery statistical time series (available at: www.fao.org/fishery/statistics/software/fishstat). However, users can also use FishStat, the new generation of the FishStat Plus software (available at www.fao.org/fishery/topic/10239en).



Egyptian Ministry of Fish Wealth

Strategies on scientific basis

Problems

Development plans

Investments

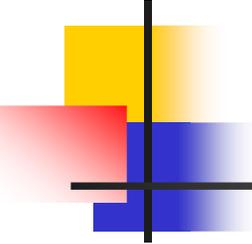
Research institutions
NIOF i.e.

Universities

IWFC



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Thank You !

