Egyptian Aquaculture
from regional and global perspectives

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Egypt

:Note

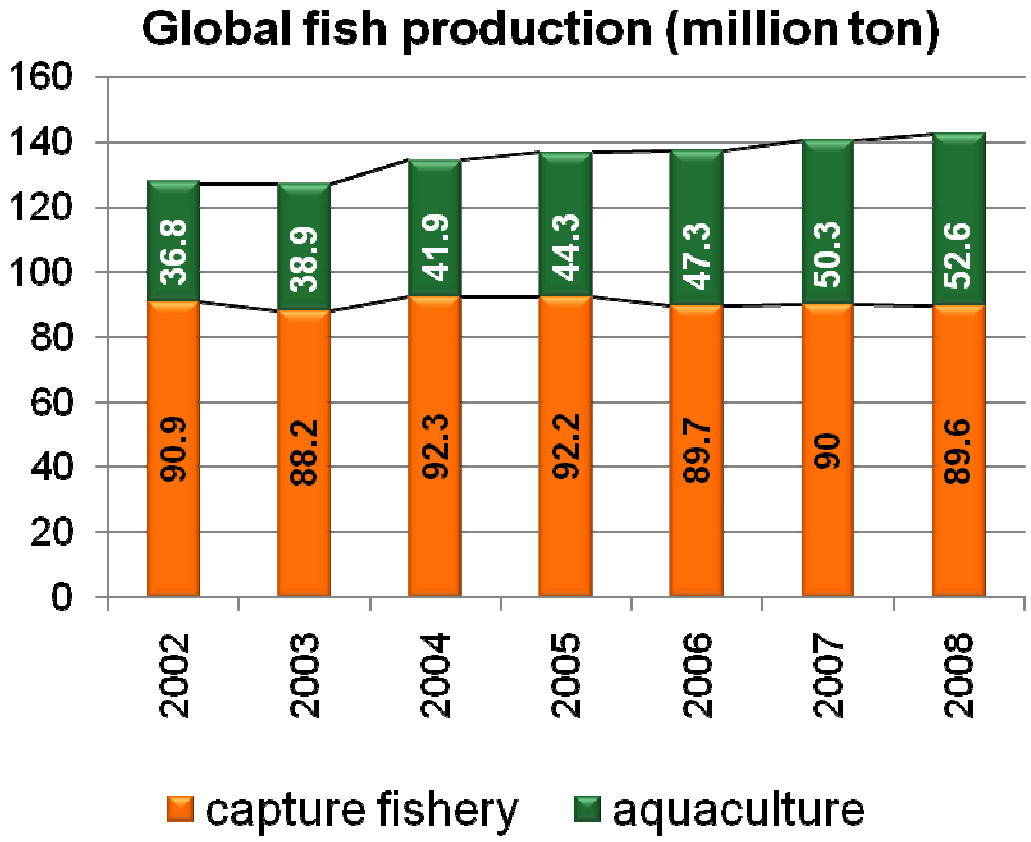
Source of global statistics: Food and Agriculture Organization of the United Nations (FAO)

Source of national statistics: General Authority for Fish Resources Development (GAFRD)

Contents of the paper

- A summary of global fish production by: resource, species and continents
- Fish production in Egypt (general)
- Egyptian aquaculture from regional and global perspectives
- Fish trade and consumption
- Development assets and scenarios
- Conclusion

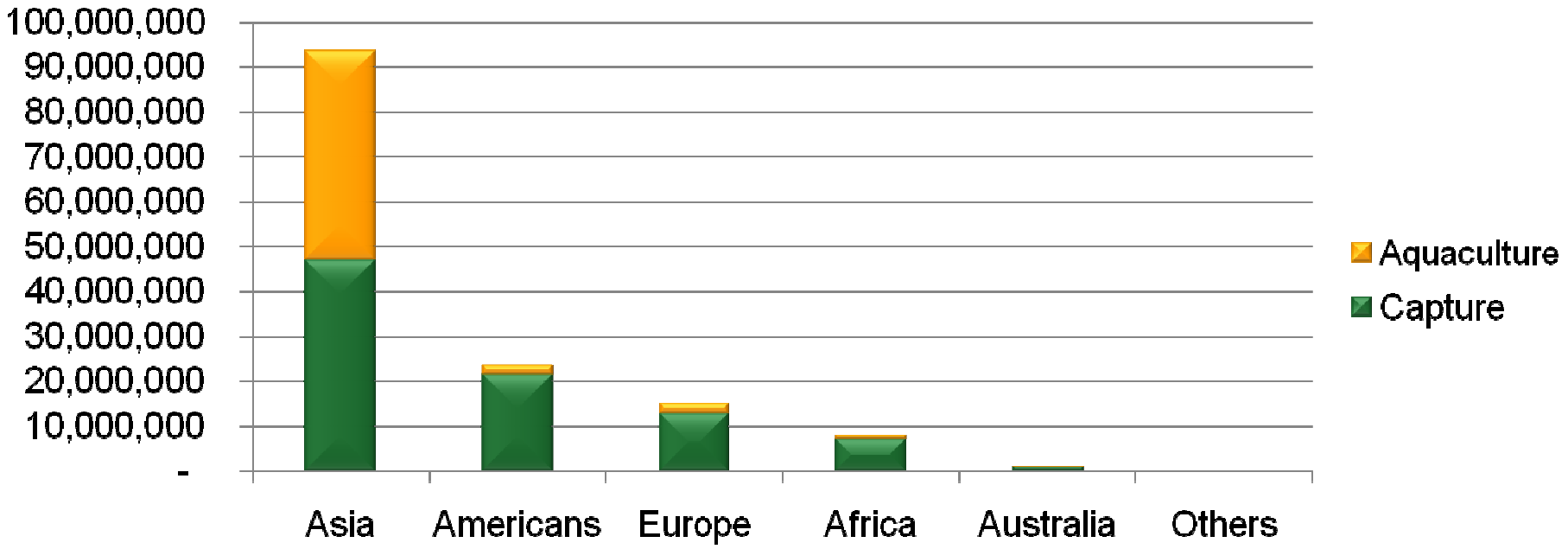
Global fish production (capture – aquaculture)



Even though global capture fishery fluctuates, aquaculture is steadily increasing reaching about 37% of total production in 2008

Over 25 years, global aquaculture enjoys highest growth rate among food production systems reaching 8.8% annually during 1970s (FAO)

Global fish production (by continents)



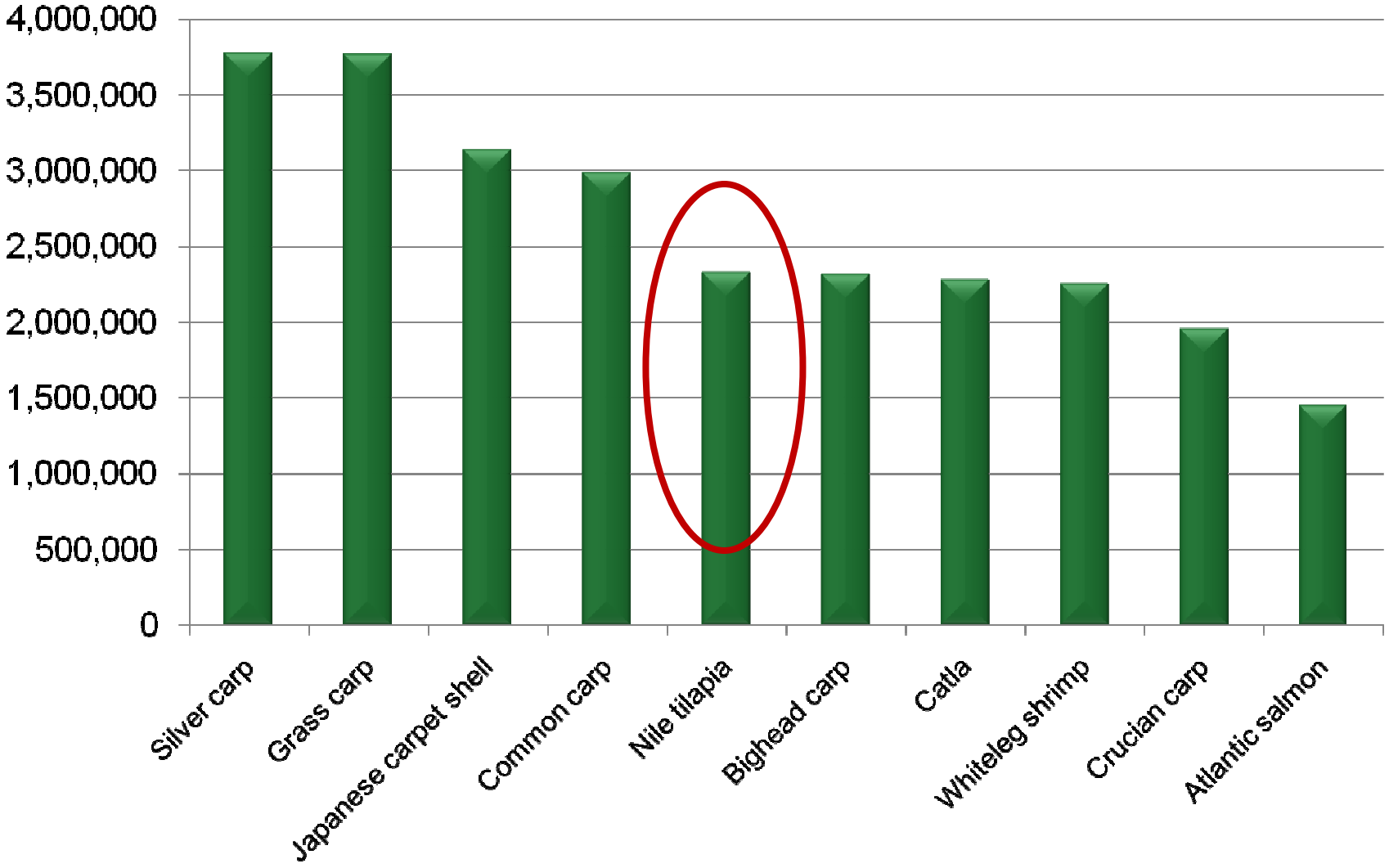
- Asia produces 2/3 of global fish production (capture fishery and aquaculture)
- Africa produces about 8% of global fishery and less than 2% of global aquaculture
- European aquaculture is declining when compared to global aquaculture

Top aquaculture producers in 2008 (ton)

The past few years, have witnessed some changes in the ranking of countries in the middle zone

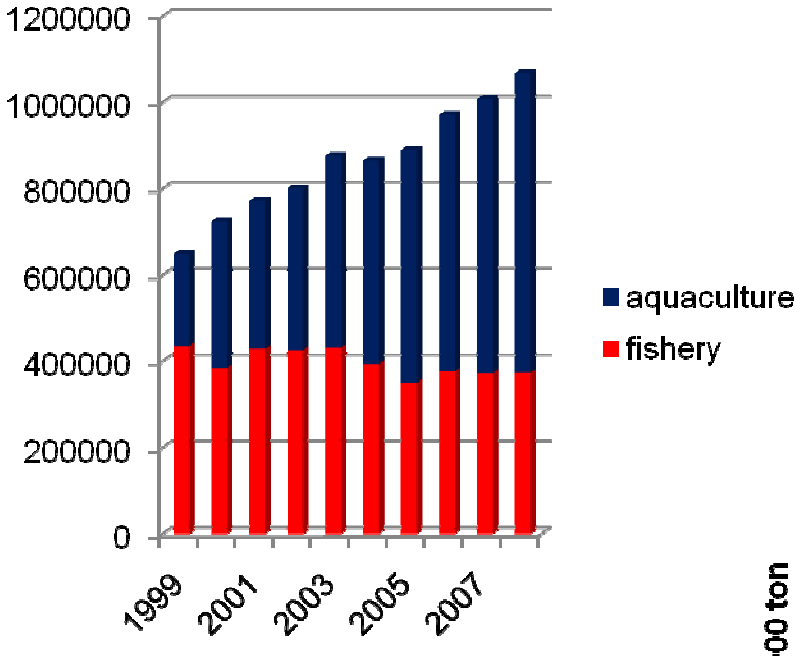
Egypt has maintained its position for the past 4 years

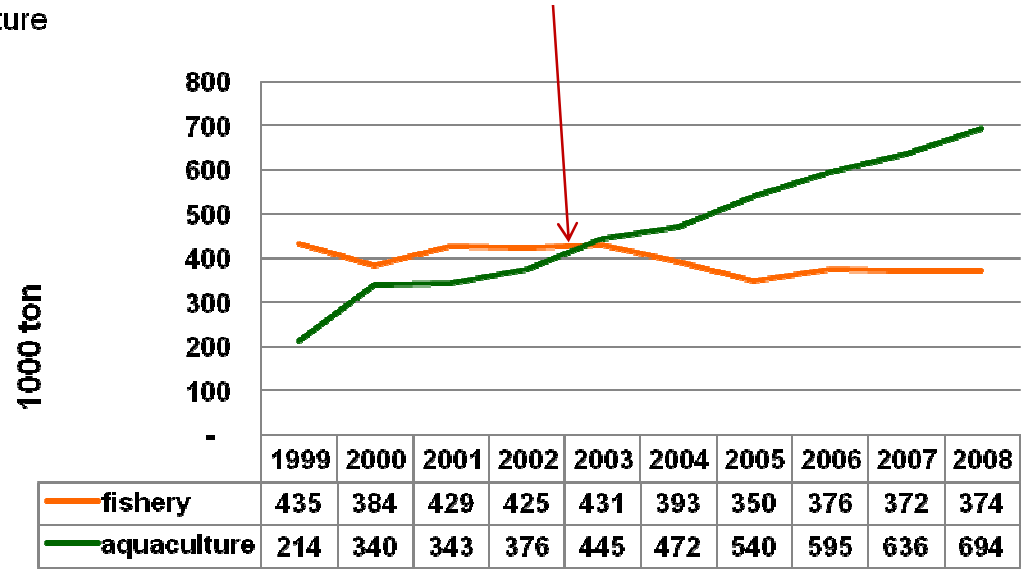
Top 10 species in global aquaculture in 2008 (ton)



Egyptian Fish Production

Contribution of capture fishery and aquaculture (1999 -2008)

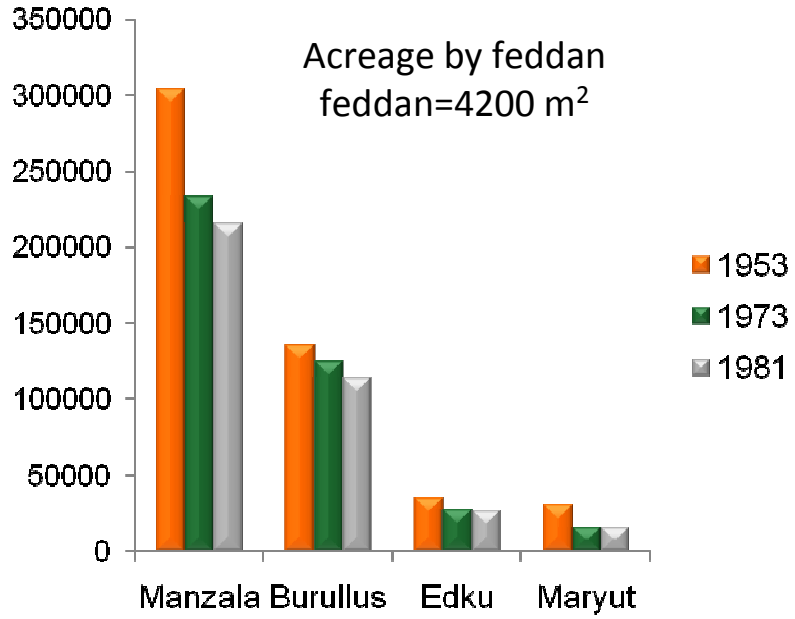




	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
fishery	435	384	429	425	431	393	350	376	372	374
aquaculture	214	340	343	376	445	472	540	595	636	694

Challenges to lake fishery

- Overfishing (general)
- Increased salinity (Qarun)
- Changes in catch composition (Bardawil)



Challenges facing northern lakes:

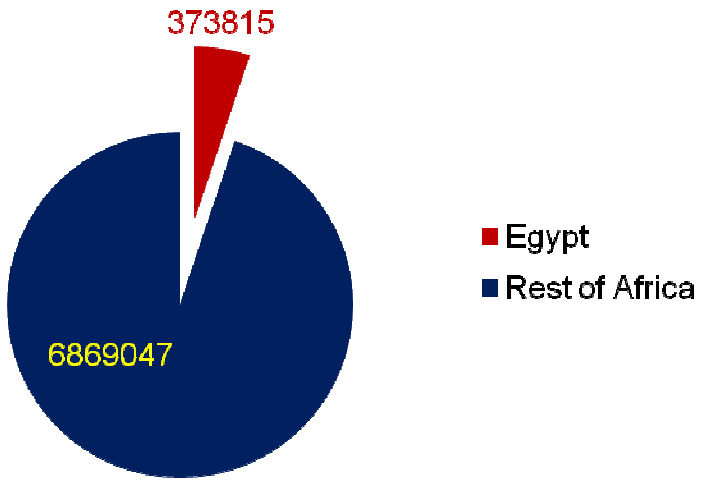
Size reduction: acreage of lakes has been reduced by 26% during 1953-1981

Pollution: vary from a lake to another

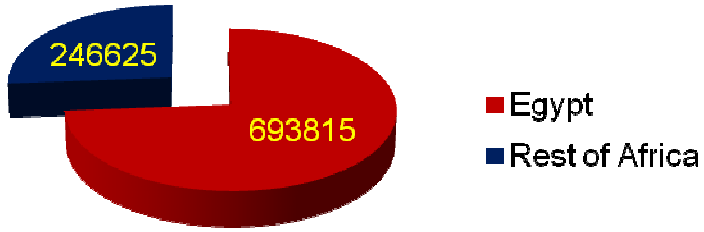
Weed infestation: common

Egyptian and regional fish production in 2008

Capture fishery



Aquaculture



Capture fishery in Egypt contributes by 5.2% of African fisheries compared to 73.8% for aquaculture

The same contribution is below 15% of fisheries and 90% of aquaculture in the Arab world

Egyptian aquaculture

Historic background

Findings & recommendations of first World Bank mission (1978) on aquaculture potential in Egypt

Expected aquaculture production is 35,000 tons of fish out of 23,4000 feddans of fish farms with an average production of 1.5 ton/feddan

Species composition is as follow:

- Tilapia 50%
- Mullet 30%
- Carp 20%

1 feddan = 4200 m^2

Findings & Recommendations of first World Bank mission (1978) on aquaculture potential in Egypt

A 15-feddan fish farm requires:

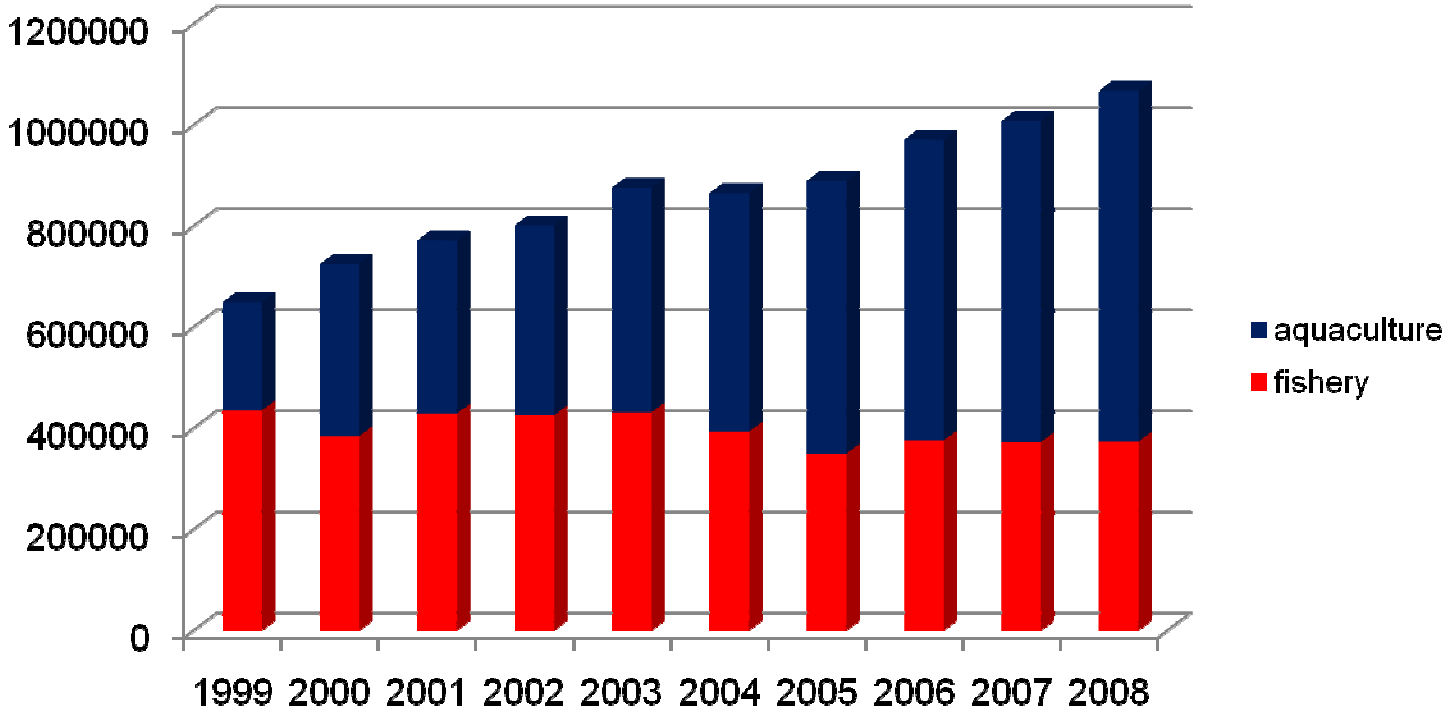
- 29 tons of manure (out of which 15 tons organic manure)
- 10.5 tons of feed (wheat bran & rice bran)
- 2 tons of small fish (for stocking)
- 175,000 m^3 of water

Findings & Recommendations of first World Bank mission (1978) on aquaculture potential in Egypt

Source of small fish:

- There is no need to establish hatcheries for tilapia or mullet
- It is possible to collect tilapia fry for the first time from the river and irrigation canals. Afterwards, natural spawning can take place on fish farms
- Mullet fry is to be collected from sea coasts
- Carp fry needs to be purchased (common carp)

Aquaculture and capture fishery (ton) over a 10-year period (1999-2008)

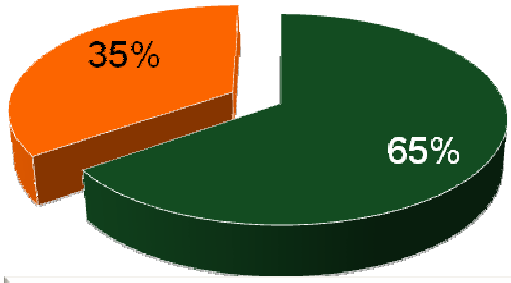


Aquaculture production exceeded capture fishery in 2003 for the first time

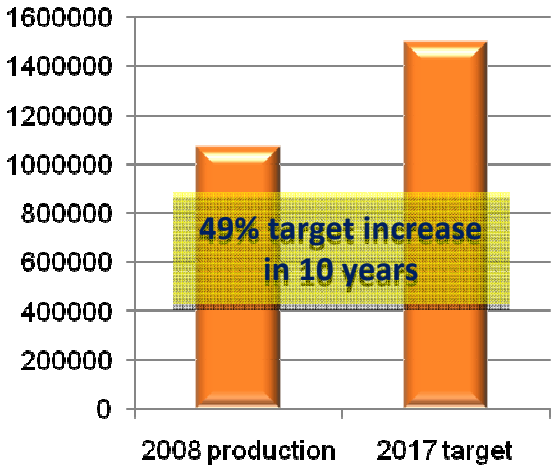
In 2008, aquaculture contributed by 65% to total fish production

Development indicators Egyptian fishery

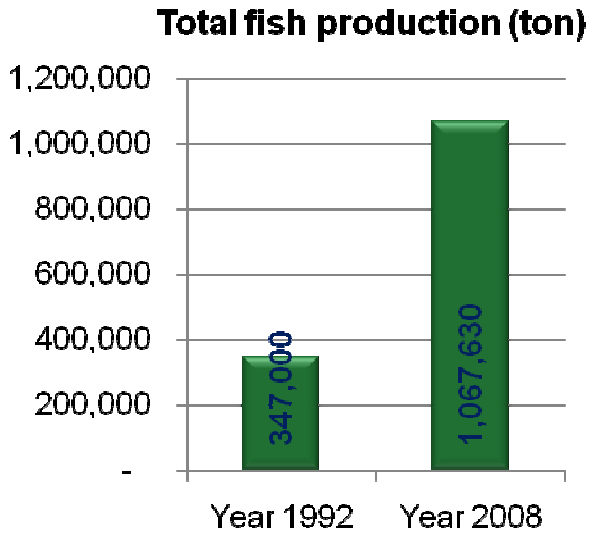
Fishery sector contributes by 7 billion Egyptian pounds which represents 7.6% of agricultural net income



Most of the increase in fish production in Egypt is attributed to aquaculture



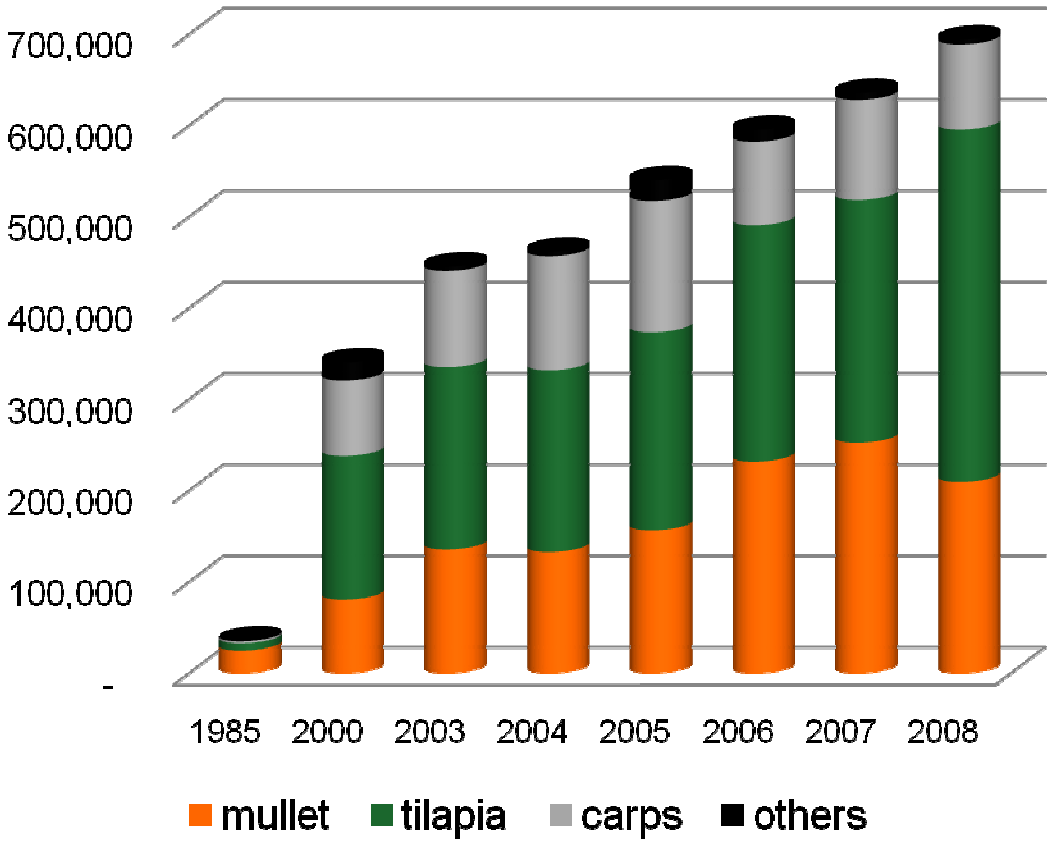
Contribution of aquaculture to total fish production increased from 17% in 1992 to 65% in 2008.



Aquaculture practices

Aquaculture

features of species composition

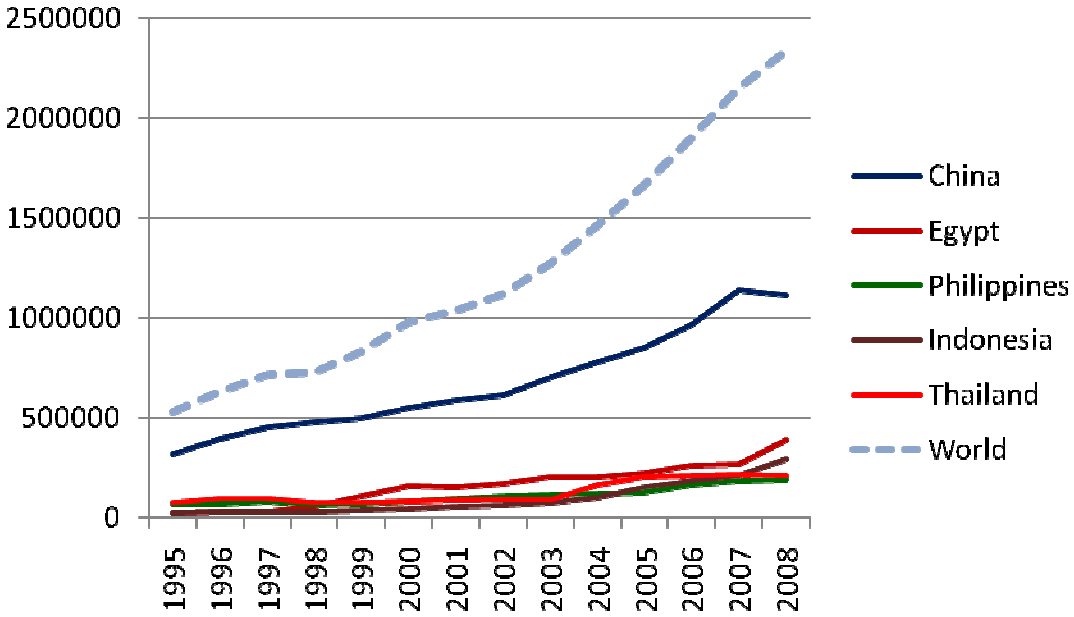


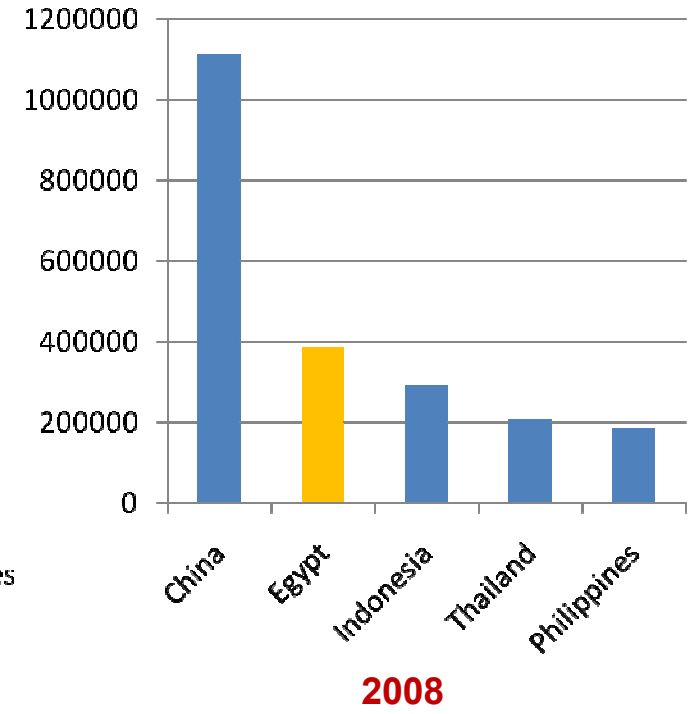
Narrow production basket

Farmed tilapia ranks second while farmed mullet ranks first globally

Mullet declines while tilapia increases over time

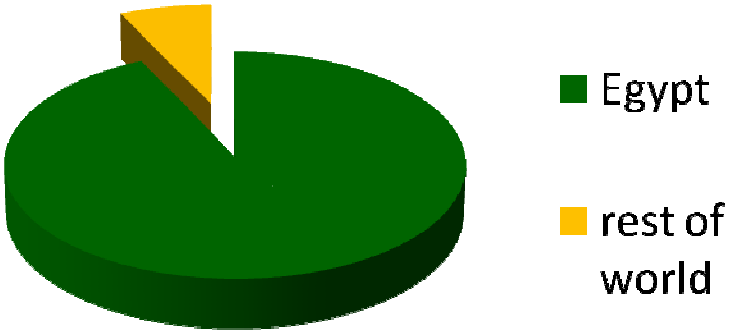
Principal tilapia producers





Mullet and gilthead sea bream production

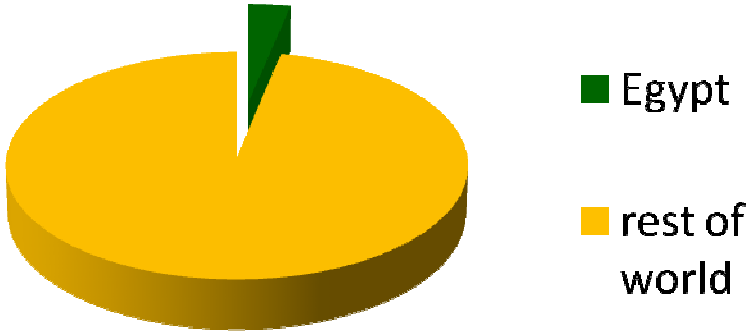
Farmed mullet



more than 93% of global farmed mullet is produced in Egypt

Farmed sea bream

A modest start and promising potential



Marine aquaculture of fin fish and shell fish

Very slow development

Promising initiatives in:

Earthen ponds

Marine cages

Enhancing marine hatcheries

Desert aquaculture

The nature of this system promotes the integration with plant or animal organisms

Sustainability of underground water is the main limiting factor

Capable to supply fish all-year round

Promising for export

Its quantified contribution is still very limited (1825 tons in 2008)

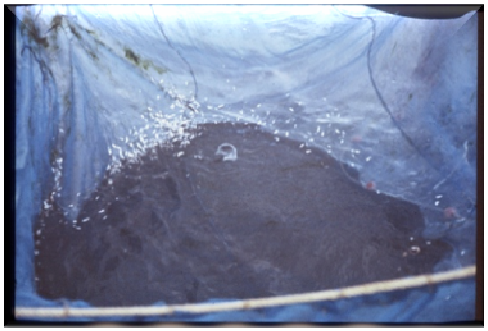
Naturally collected fry

Until hatchery produced mullet becomes available in sufficient quantities and affordable prices, nature will remain the main source of mullet fry

The same is true for sea bass and sea bream fry

Mullet fry represented about 97% of total number of marine fry collected in 2008 (76.5 million); the remaining is for sea bream, sea bass and eels

Not sufficient to meet the requirements of fish farms



Fish hatcheries

Dominated by tilapia hatcheries whereby more than 85% is produced in private hatcheries. Actual production is believed to exceed the reported 141 million fingerlings in 2008

Fingerlings of carp species are produced in governmental hatcheries for the integration in rice fields and the biological control of aquatic plants projects

A limited number of marine hatcheries with their limited operations produced 15 million fry in 2008

A model of challenges (Nile cages)

(flourishing – banning –reviving attempts)

Damietta Branch

Rosetta Branch

Rayaan Depressions

Fish feed industry

Well-developed industry

Some feed exports (Arab & African countries)

Most of feed Ingredients are imported

Cost of feed is a limiting factor in the sustainability & development of aquaculture

In the absence of a reliable statistics on fish feed, it is estimated that about 250,000 tons of fish feed is produced

About a million tons of feed will be needed to meet aquaculture strategy

A variety of fish feed is/could be produced if economically justified (shrimp feed, marine larval feed)

With the exception of 10,000 tons, feed is produced in private feed mills

Some feed mills acquired ISO and good manufacturing practices certificates

Fish Trade

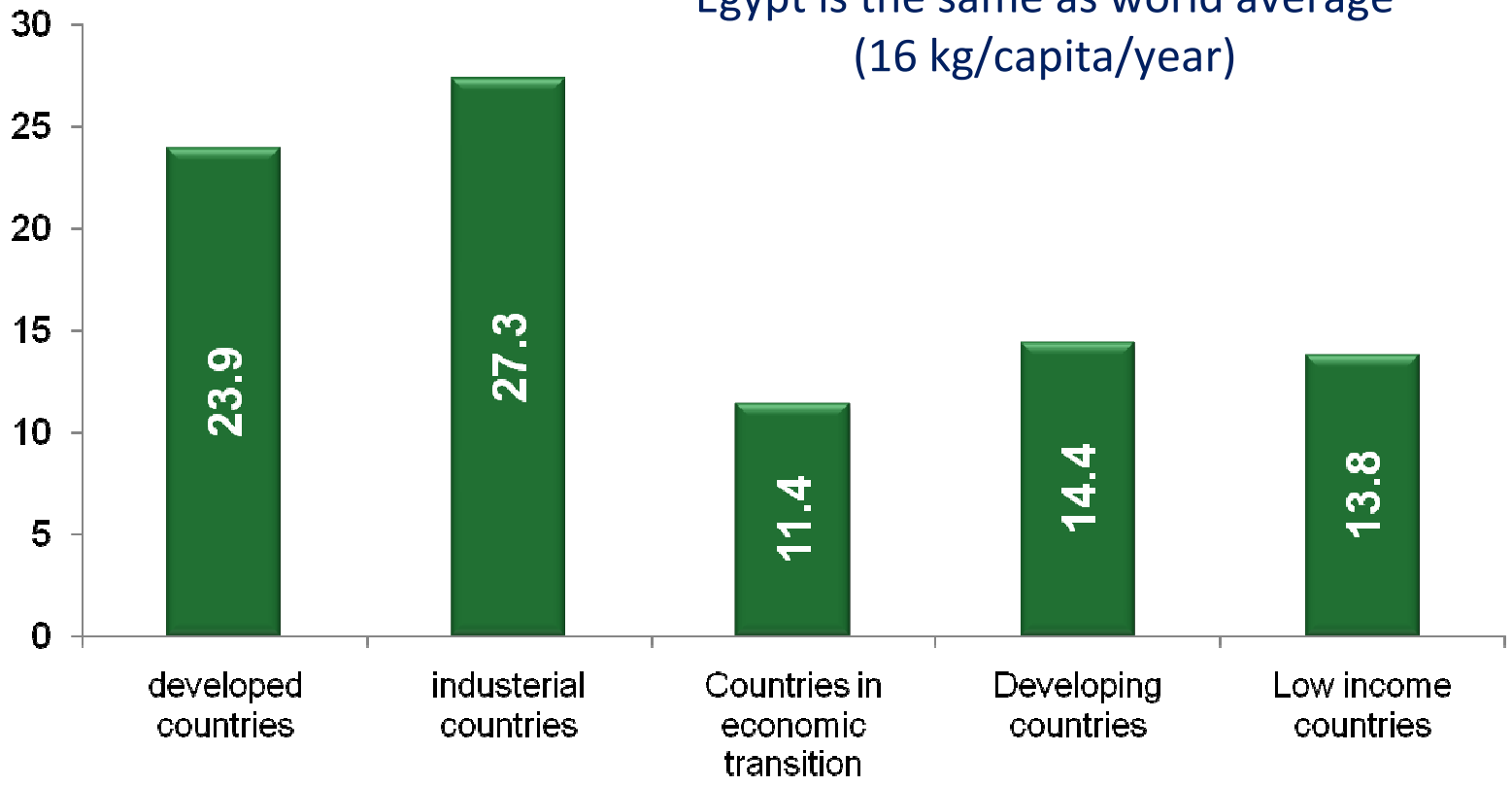
Fish trade and consumption (1)

Fishery resources (t)	2007	2008
Local production	1008008	1067630
Imports	258931	136807
Exports	4417	6627
Consumption	1262522	1197710

Export information need to be detailed

Fish trade and consumption

Per capita of fish consumption in Egypt is the same as world average (16 kg/capita/year)



Fish trade - imports

The continuation of imports does not represent a problem as long as does not affect Egyptian key fish (tilapia), what is needed is to encourage fish exports once found feasible

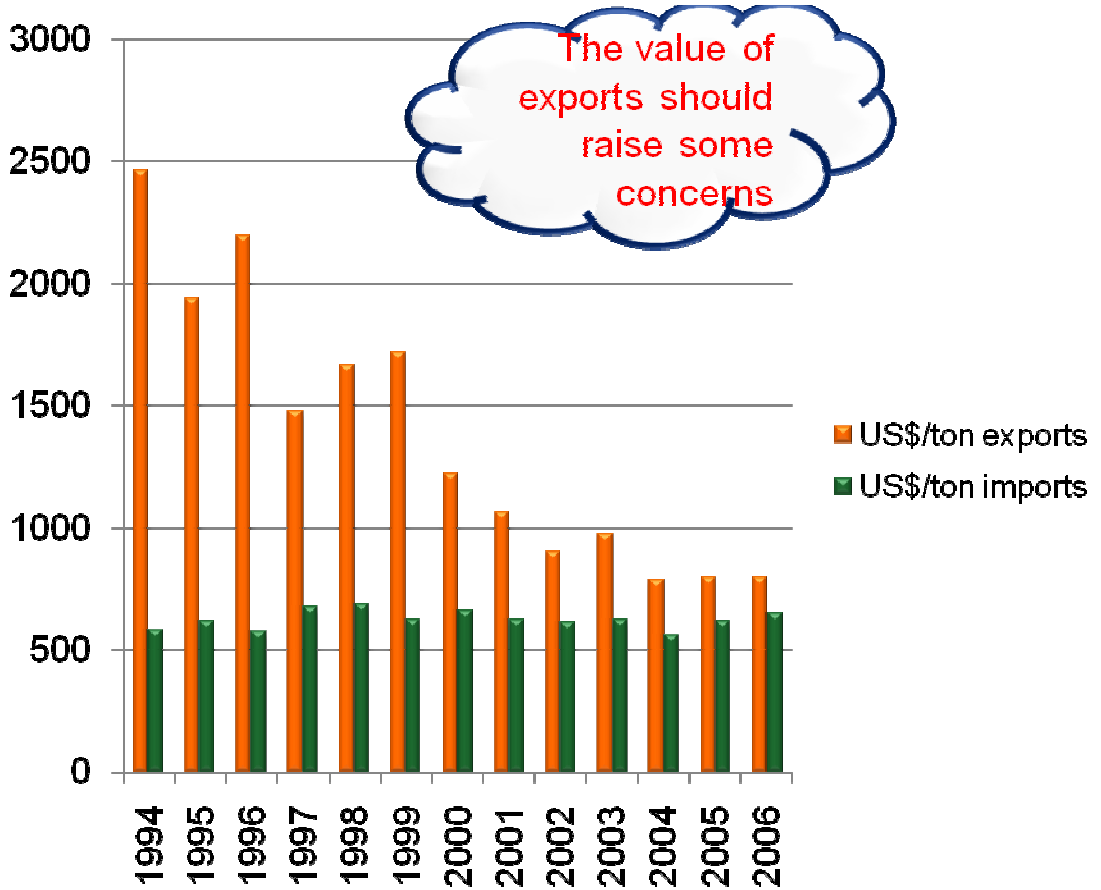
The information on fish imports needs validation due to the several agencies in charge – without having solid information, it will be difficult to realistically estimate the market capacity as well as the true consumption

Fish trade - exports

During 1980, Bardawil lagoon used to be the main source of fish export

A modest quantity from particular capture fishery resources is exported in the present

Farmed fish is not exported for some reasons especially the law of water use



Exports and sustainability

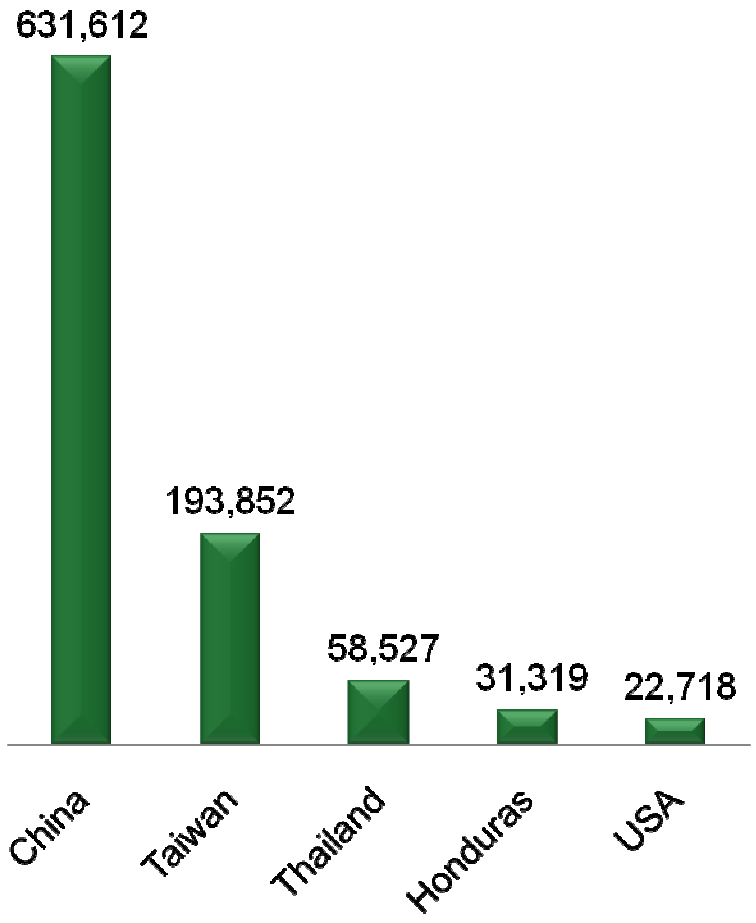
Promoting exports should not be on the cost of the sustainability of species

Sea cucumber- heavily overfished

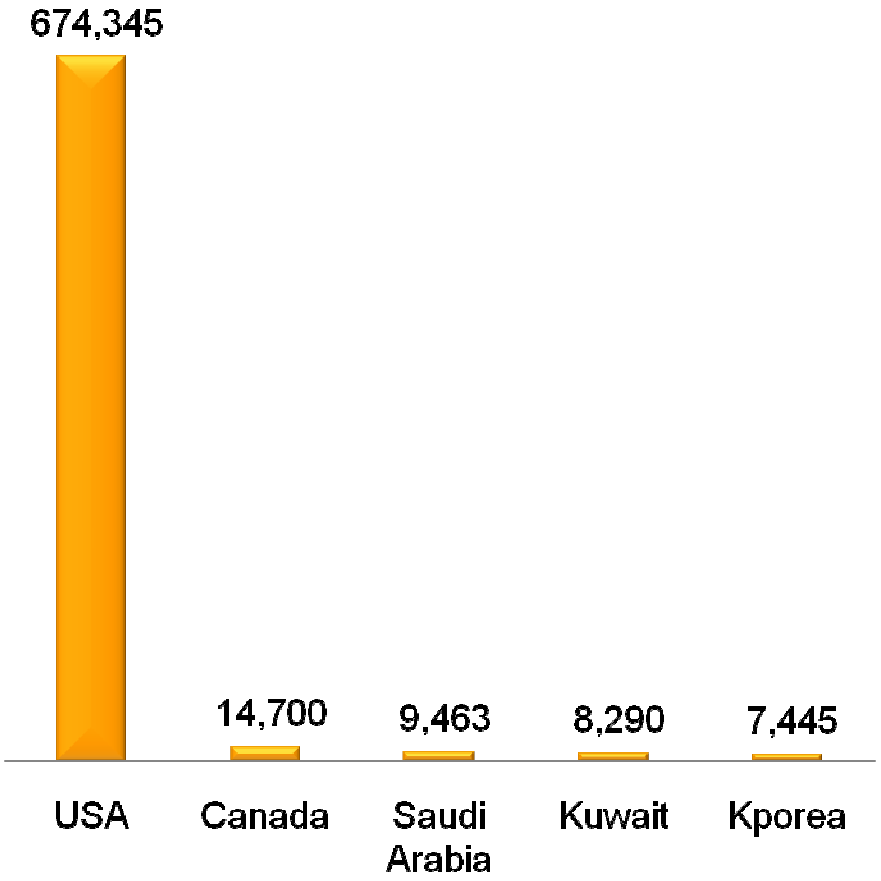
Octopus – questionable sustainability

Tilapia trade (2007)

Tilapia exporters (ton)

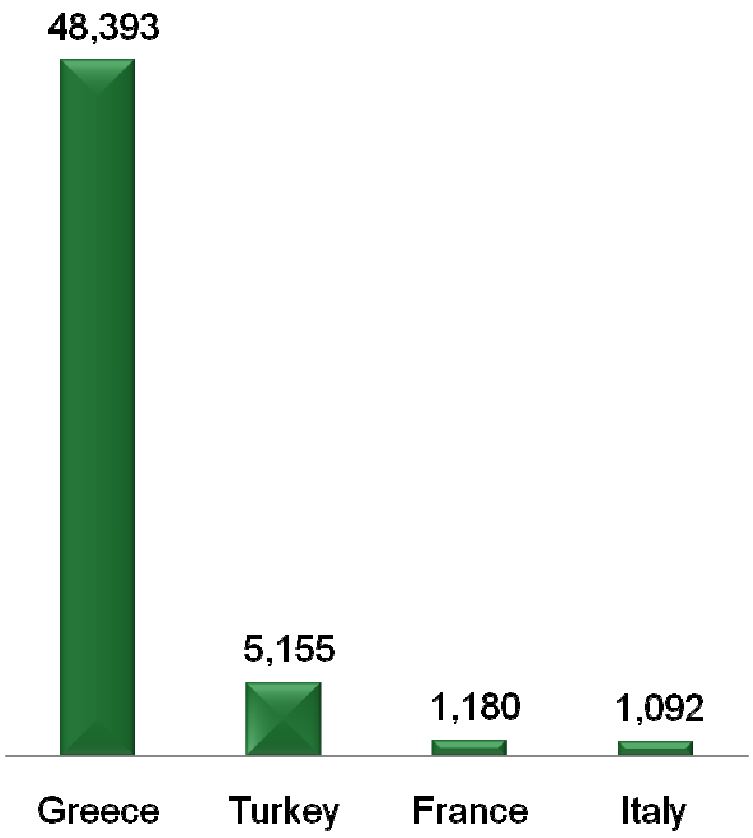


Tilapia importers (ton)

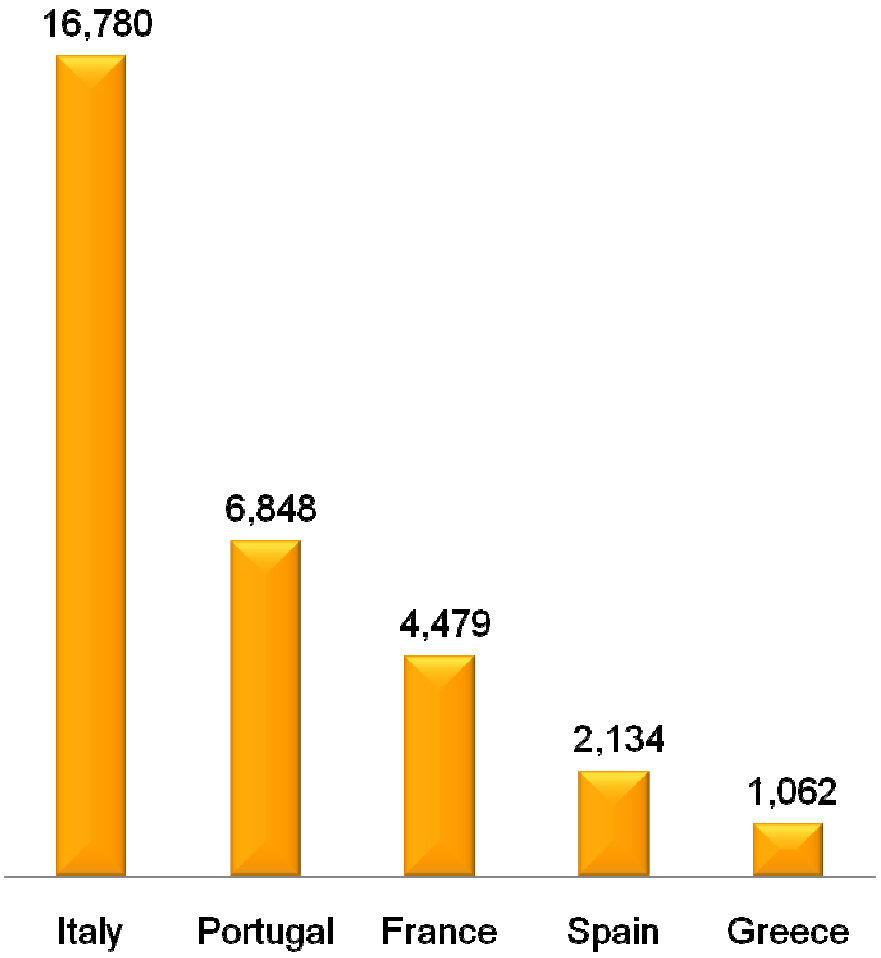


Gilthead sea bream trade (2007)

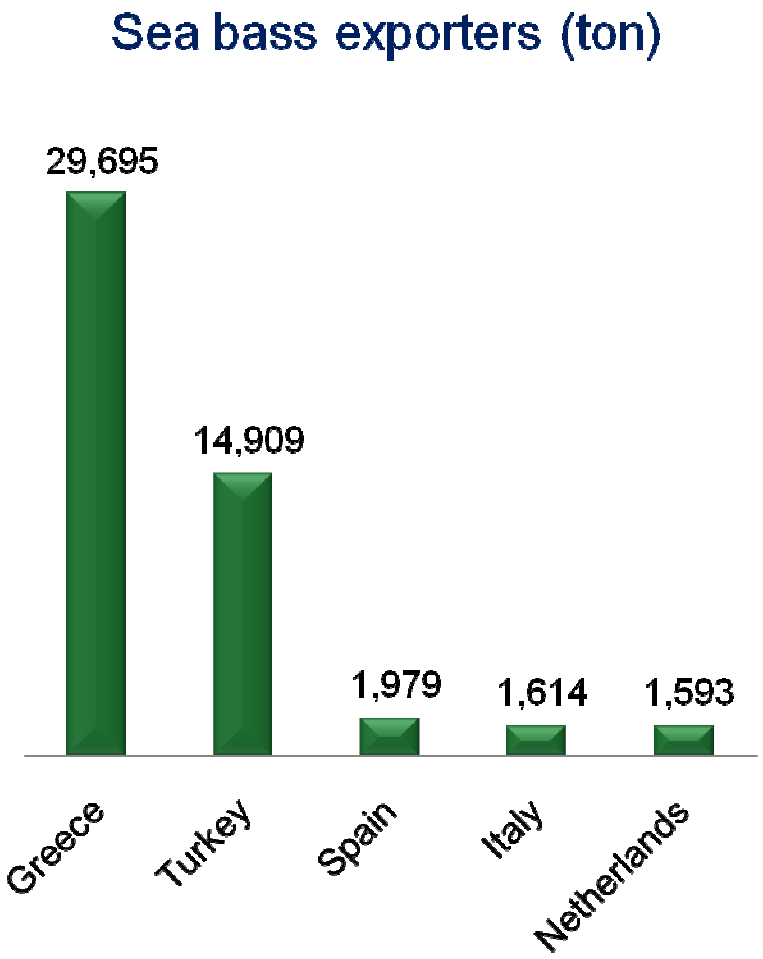
Bream exporters (ton)

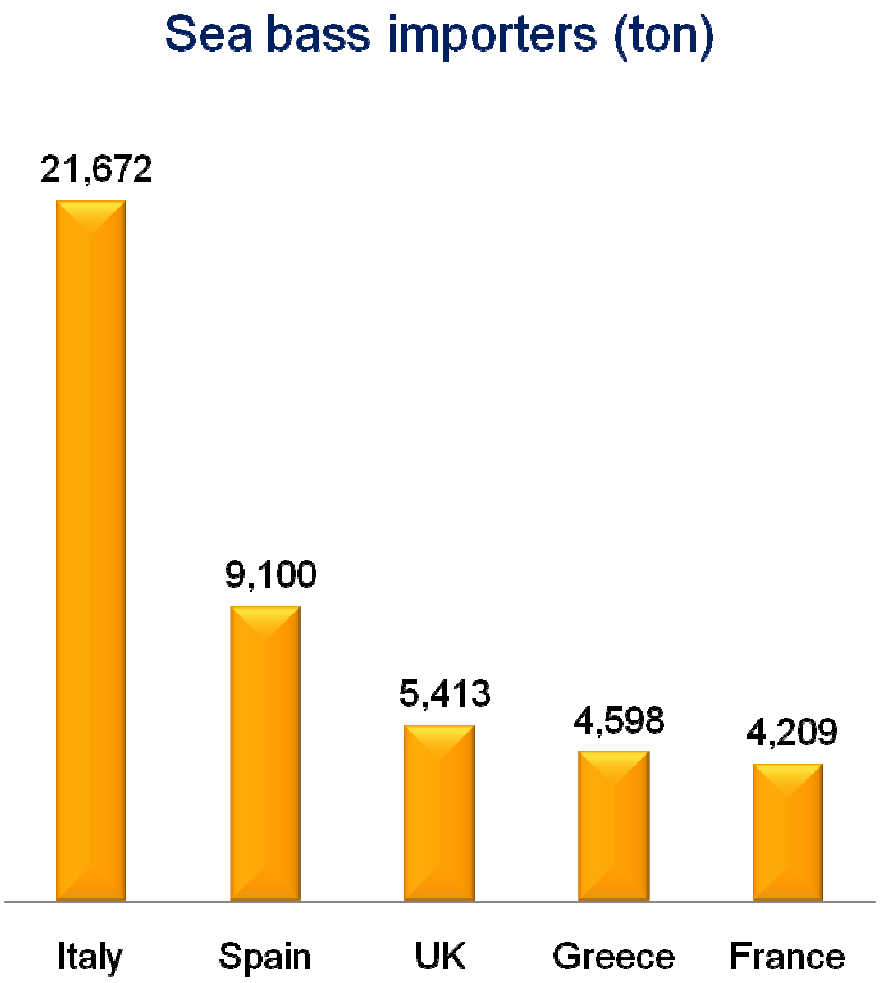


Bream importers (ton)

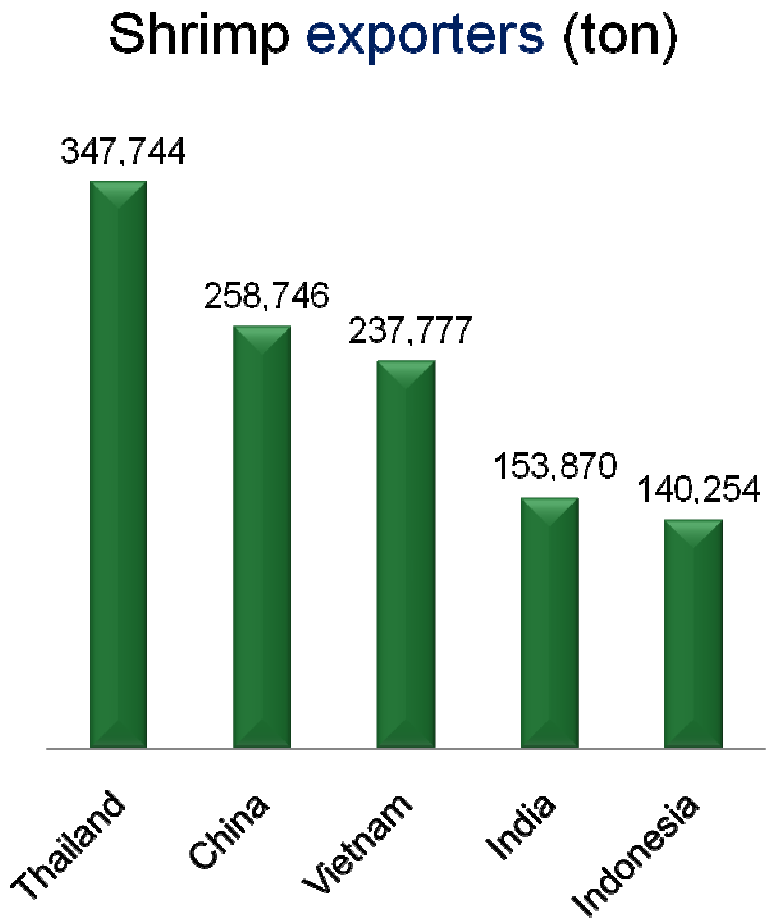


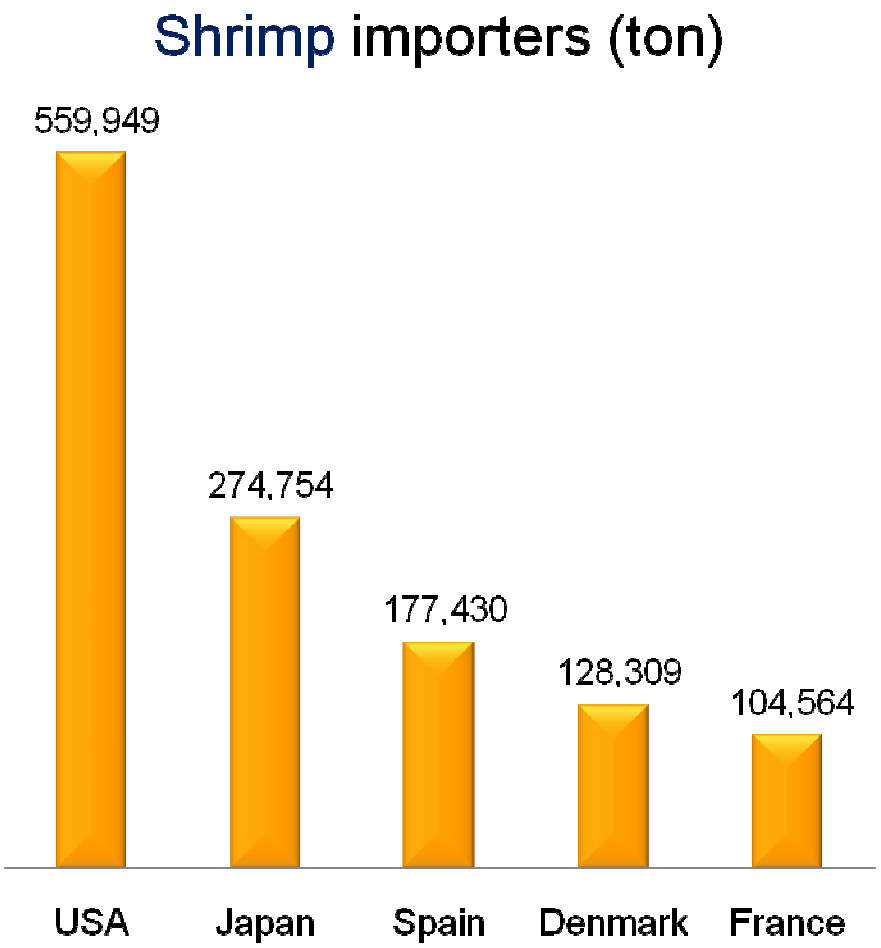
European sea bass trade (2007)



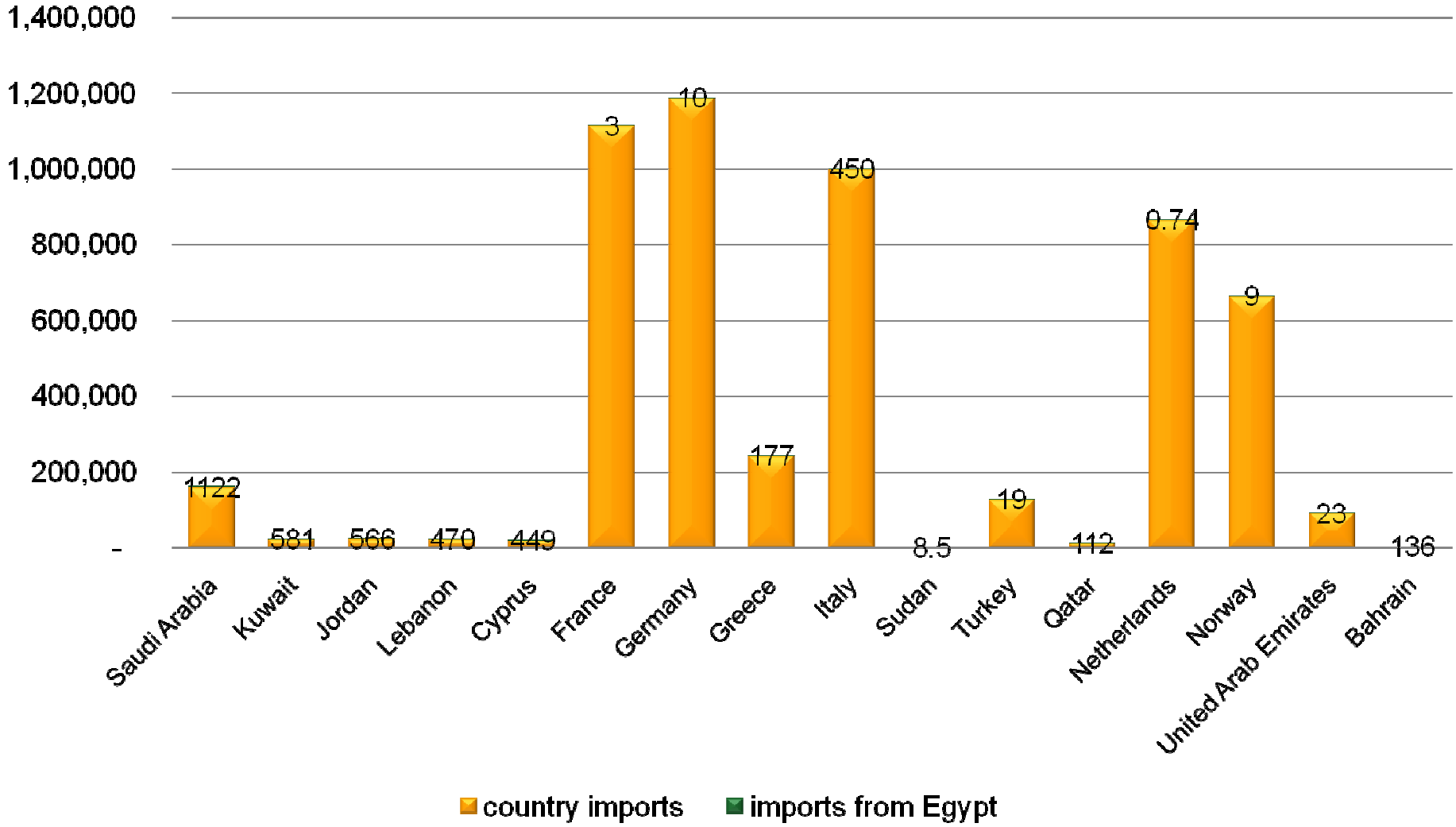


Shrimp trade (2007)





Contribution of fish exports from Egypt to the imports of selected countries (ton)



Assets of development

Utilizing present achievements

- Significant development by which Egypt ranks 11 globally for several years
- Emphasizing in the national strategy on fish as a key source for animal protein
- Achievements in tilapia farming placing Egypt second globally
- Well trained human resources capable to absorb and apply new technologies
- European fish production (capture & aquaculture) is on decline which gives an exporting opportunity to Egyptian fish

Carrying out the components of the national plan

In regard to marine aquaculture:

- Growing awareness on the importance of marine aquaculture in Egypt
- The existence of several marine hatcheries whether in operation or under construction - These hatcheries produce or target the production of required marine fish and shrimp
- Availability of well-trained human resources to start with and to ensure efficient operations of marine aquaculture projects
- Climatic conditions in Egypt favors the production of premium sizes that enjoy high demand and offer it in better marketing seasons
- Relying on hatchery produced marine fry would help reduce the over fishing of naturally occurring marine fry.

Export foundations

- Increasing numbers of fish export establishments which adopt international quality standards. These establishments are expected to play a major role in exporting larger quantities of fish
- Closeness from target markets is advantageous in regard to cost of shipping as well as the ability to export fish products of high demand (fresh/chilled)
- There is positive indicators for Egyptian fish in international markets especially the modest quantities exported at the moment could be considerably increased
- Utilizing the significant development in food sector in providing varieties of fish products
- It seems possible to enjoy a larger share of fish imports for target countries

Fish feed infrastructures

- The existence of well developed feed mills that produce about 250,000 tons of feed provide confidence as well as regional and international competitiveness
- Doubling aquaculture production by 2017 would require more use of fish feed in addition to the production of particular feeds as needed in the future.
- Exported feed is expected to increase for at least 10 years from now
- Partial sufficiency for some feed Ingredients through farming of some agricultural crops such as yellow corn

Development approaches

Necessity of intensification– condition to its feasibility

Coincided with capacity building

Horizontal expansion became limited

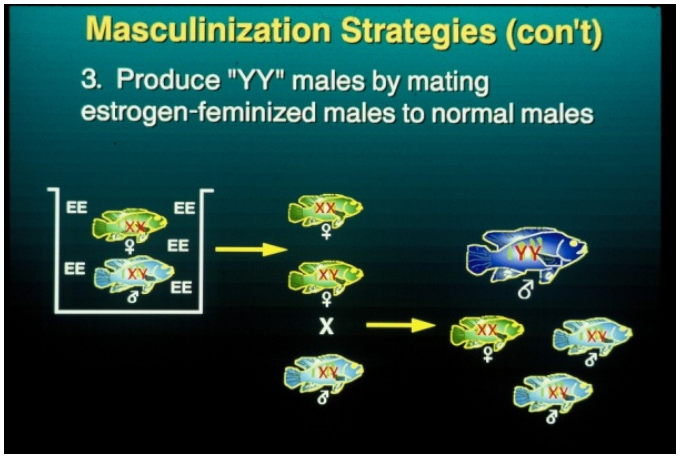
Earthen ponds – development priorities

The principal farming system in the present and in the future – Any rate of development must have a significant outcomes

Tilapia – there is enough room for its development

The use of super male would help in the export of tilapia products

Most of tilapia gene banks are located in Asia: Philippines and China



Asian countries benefitted much from genetic enhancement of tilapia

Expanding production basket

Marine aquaculture

The concept of diversification is required

Quantities of target species should be realistic

Regardless the level of diversification, tilapias continue to dominate

Promising species – would require research and marketing efforts

Expanding production basket through processing

Shrimp types vary considerably according to consumer preference

Fresh tilapia fillets enjoy high demands and premium value

Photo credits (tilapia): Dr. Keven Fitzesman

The productivity of integrated rice-fish could be significantly improved

Less acreages and higher yields would lead to successful dissemination of the technology as practiced in Asian and African countries

Promising initiatives
(rotating agriculture – aquaculture)

Its outcomes may help changes the image on the use of natural resources

Rotating tilapia and wheat farming

Positive Initiatives

There is an obvious consideration to the scarcity of water resources in Egypt as reflected in modern watering technologies

Discharges from fish ponds are mechanically filtered before its use in agriculture

Quality and safety of fish products

Egyptian Organization for Standardization & Quality (EOS) is the agency in charge of quality and setting quality specifications

With the approval of EOS, it is possible to apply specific international standards if not issued yet by EOS

Enhancing quality will lead to increase the consumption of fish products

The only choice in the light of:

Growing health among Egyptian consumers

The need of markets and international trade

This applies on production as well as imports

It is recommended to benefit from similar cases

Most producers are willing to adopt quality measures especially when linked to economic returns

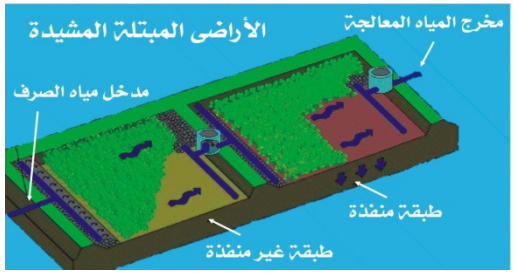
Water resources and aquaculture

Most challenging factor that necessitates:

Enhancing the productivity of unit of water

Availability of a mechanism to ensure the quality of aquaculture water

Exploring alternative water resources



Biological water treatment (established technology)

Use of brackish water for aquaculture in the future

Requirements - applications

Changing the vision to aquaculture would respect the nature and so the productivity of land

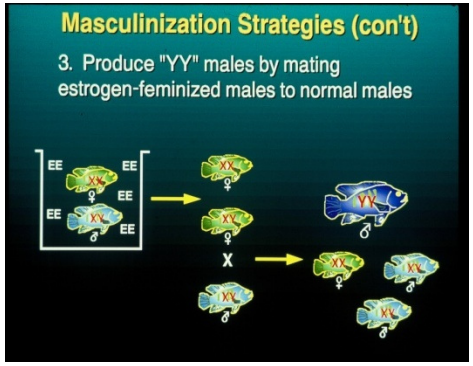
When land is allocated based on its production capacity

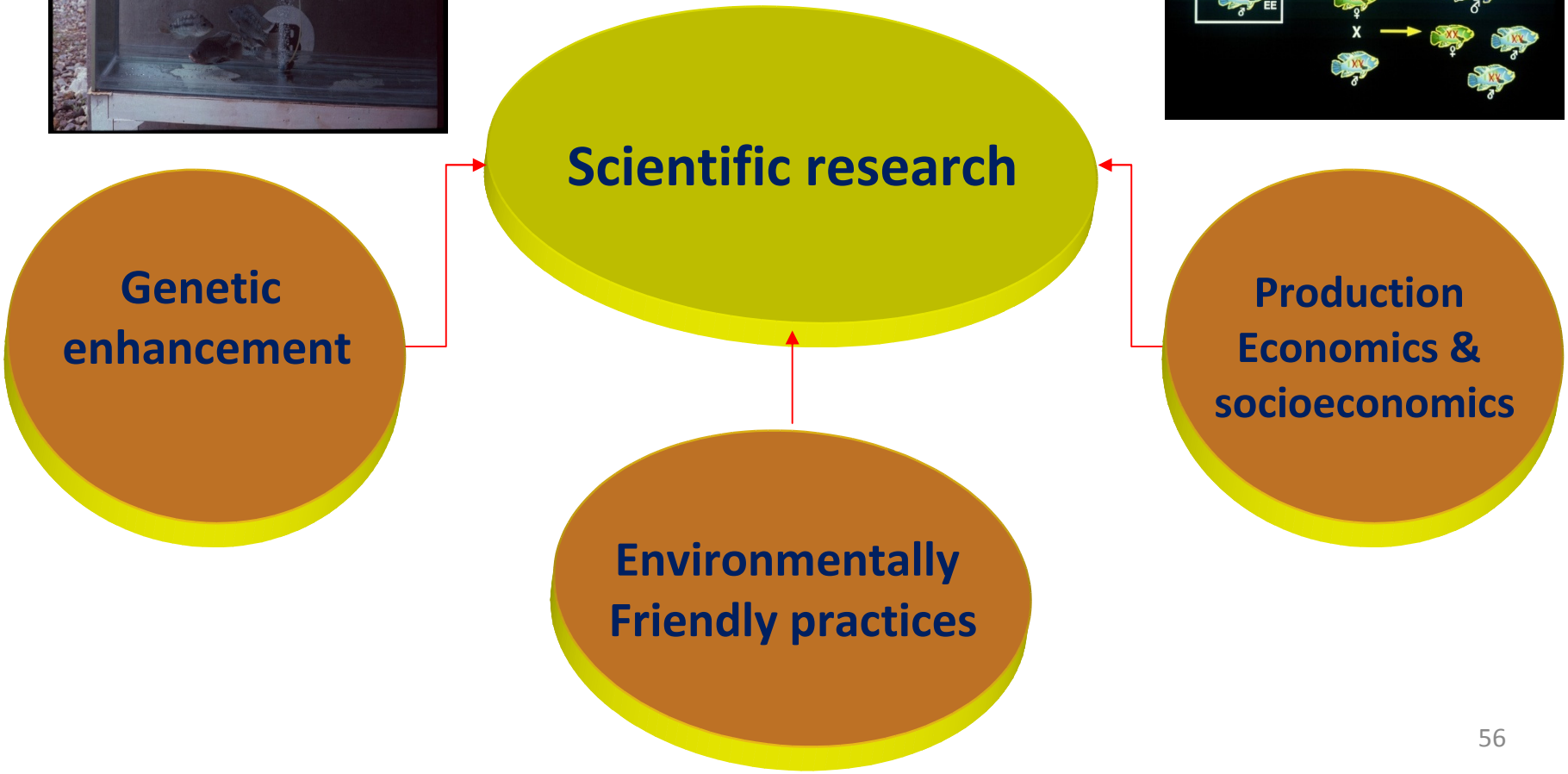
Salty soils during salt leaching would fit aquaculture more than agriculture

If in future, fish is treated like any other agricultural crops, land after salt leaching could continue in aquaculture and not necessarily shift to agriculture. This could depend on economic feasibility.

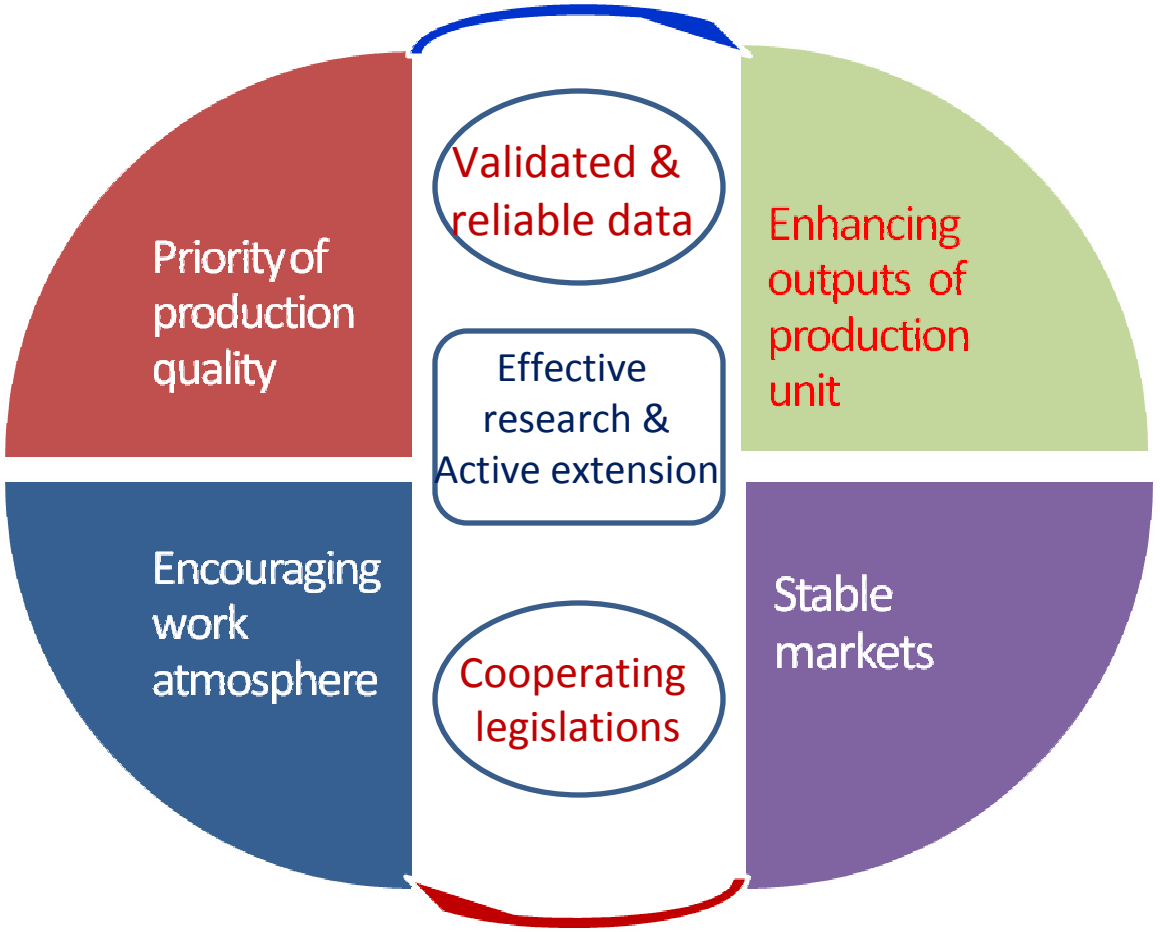
Scientific research

Living the development of aquaculture





Pillars of aquaculture development



Conclusion

- The contribution of aquaculture in the overall fish production is expected to increase
- The concerns over water use in general would necessitate the adoption of intensive and integrated aquaculture systems
- Quality and safety of fish products is not optional
- Even though, production basket would expand, tilapia will continue to top the production
- The importance of economic production would share the biomass production including production costs especially feed
- Some elements used to be treated as fancy items should receive the value they deserve. These include genetic enhancement, environmental impacts, aquaculture engineering and bio-economics
- The role of scientific research would increasingly contributing to aquaculture development whether in the present or in the future

Thanks for your time. I hope you have found in this paper some of what you were looking for

While welcoming you to use the contents of this paper, thanks in advance for referring to it

If you have any comment about this paper and you need clarification or elaboration, I would welcome your contact via my email address

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