



FISHERIES: A PROMISING AND PIONEER ROLE TO FACE MALNUTRITION

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Introduction:



The fishery sector is one of the most promising sectors that contribute to moving the national economy, enhancing food security and raising the level of nutrition in Yemen. Yemen has a coastline extending to a length of about 2500 km oversees 10 coastal governorates, including 3 governorates on the coast of the Red Sea, “Hajja, Hodeidah” Taiz “and the rest on the coasts of the Gulf of Aden and the Arabian Sea,” Lahj, Aden, Abyan, Shabwa, Hadramaut, Al-Mahra and Socotra Archipelago. Yemen also has more than 150 islands located mostly in the Red Sea. Therefore, Yemen enjoys environmental and living diversity of the pelagic and demersal fisheries, as well as marine lives along the coastline and the shores of the islands. The results of fishery studies and researches indicate that there are 350 to 400 species of fish and other marine lives, of which only 60 species have been exploited, representing 15-17% of the total fish species in Yemeni waters. These studies also confirmed that the production capacity of these coasts reaches about 350-400 thousand tons per year. While the actual exploitation does not exceed 200 thousand tons per year, there are still many investment opportunities in the field of fishing, marketing and export or in the forward and backward industries of investment in the field of storage, cooling, canning, shipbuilding, boats and fishing nets.

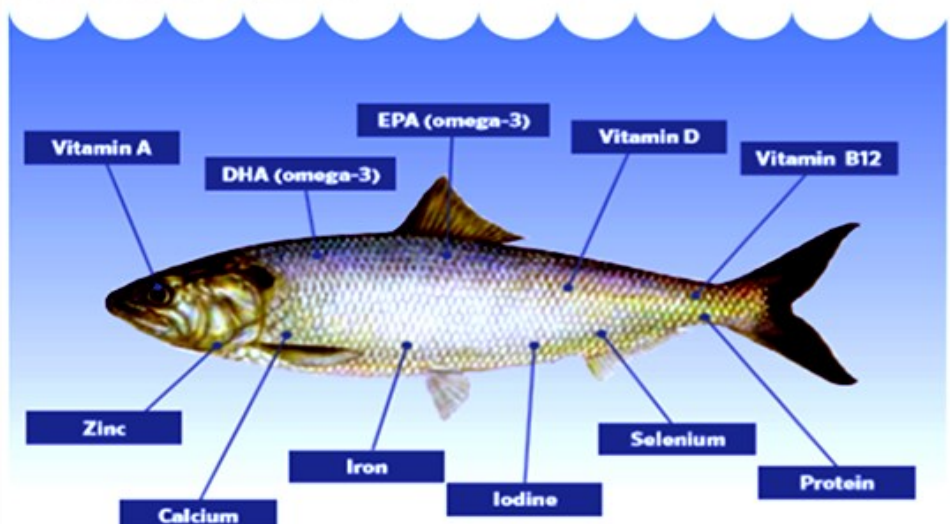
- » The vision of the fisheries sector to contribute to raising the level of nutrition in Yemen
- » Current status of fish production
- » The role of fish and marine life in raising nutrition.
- » Fish farming in Yemen reality and hope
- » Fisheries associations and cooperatives.
- » The role of investment in the development of the fisheries sector.
- » Damage to the fisheries sector as a result of the ongoing war on Yemen.

Vision Of the Fisheries Sector to Contribute to Raising the Level of Nutrition in Yemen:

Fish and marine life contain a high percentage of proteins and micronutrients that help to improve nutrition, especially among women and children, and within the framework of nutrition plan multi-sectors aimed at raising the level of nutrition in Yemen and adopted by the Secretariat to raise the level of nutrition (SUN Yemen). The Ministry sought to prepare an integrated vision to strengthen the nutrition aspect through a package of interventions and studied activities, which was supervised by local and international experts in the field of nutrition aimed basically to:

- 1) Raise awareness of the importance of fish consumption as food contributing to alleviate malnutrition.
- 2) Expand the marketing of fish and fish products and to cover areas that are not covered by fish products.
- 3) Ensure the quality of fish through raising the capacities in all stages “production, preparation, marketing”.
- 4) Strengthen livelihoods in coastal communities and support coastal women through a package of small-scale projects that contribute to increasing income and improving the livelihoods of families.
- 5) Enhance the role of fish research in order to preserve and sustain fish stocks.
- 6) Increase fish production through the adoption of aquaculture projects and encouraging expansion in this area.
- 7) Provide nutrition programs for small-scale productive fishermen to raise nutritional awareness in coastal communities.
- 8) Encourage the business sector, especially small and medium enterprises, to invest in the fisheries field.

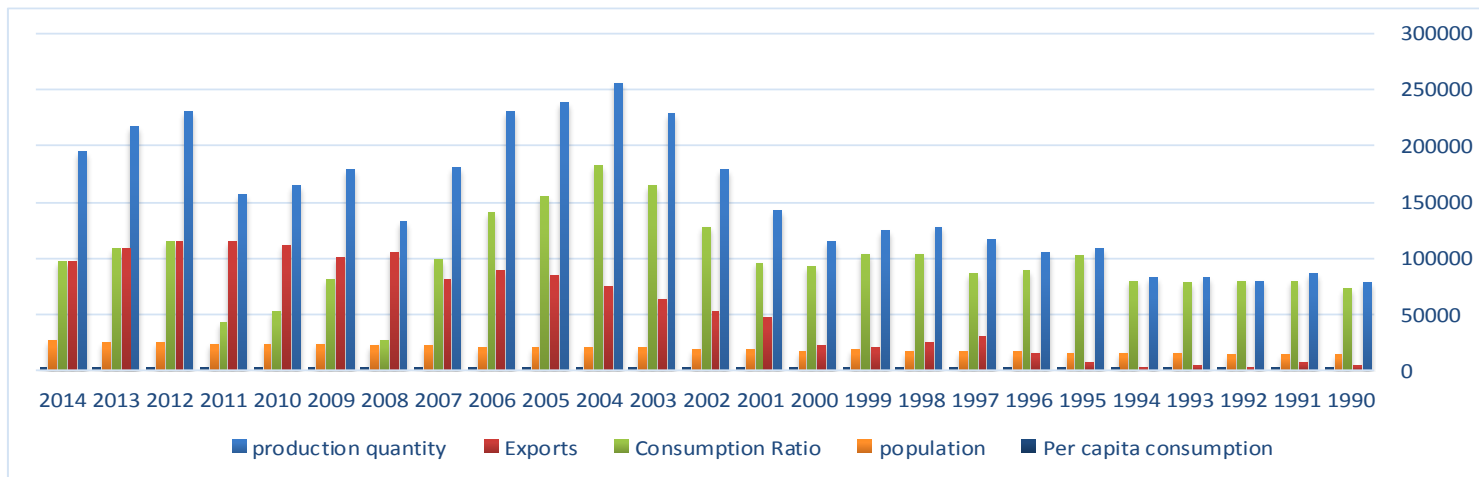
Fish: Nature's superfood



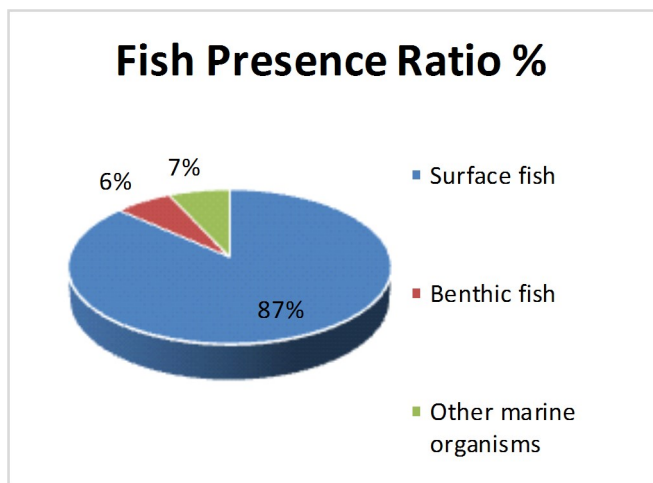
Current Situation of Fish Production:

Development of the volume of national (local) aquaculture production during the period 1990-2017

During the past few years, the fishery sector has had a lot of financial resources and investment opportunities. These resources have been reflected in the remarkable increase in production during this period. The measures have been taken to identify and develop coastal services with all their components as the main pillar for the development of traditional and commercial production processes.



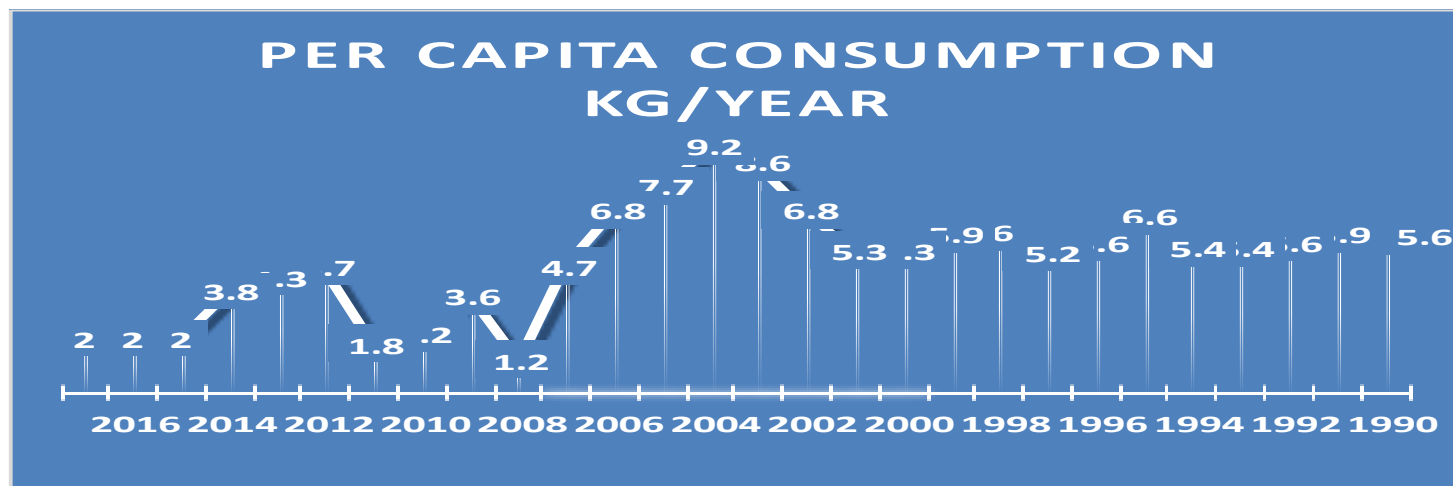
As a result of the remarkable development in fish production, the exploitation rate of fish stocks increased from 19% to 57.5% in 2006. Large and small pelagic fish constitute the largest share of fish and other marine species caught by 86.6%. These species are considered the most consumed fish locally and abroad. The size of the demersal fish is about 6.5% in addition to 6.9% of other marine life.



Development of average per capita consumption rates (1990-2017)

The per capita consumption rates are influenced by three basic elements (production, exports and population growth). Yemen witnessed an improvement in production and exports and a decrease in the population growth rate from 3.7% to 3.1%. Population of the Republic.

Annual per capita consumption of fish supplies for the years (1990-2017)








The Role of Fish and Marine Life in Raising the Level of Nutrition:

The fisheries sector contributes to the provision of food for domestic consumption in reducing the volume of imports of red and white meat, where 70% of the volume of production of fresh and canned fish are consumed annually, led to an increase in per capita consumption to 8 kg per year.

Fish is an important nutrient for all of the world's population despite the large geographical variation. Fish and fishery products are an important and high-quality source of proteins. The proportion of proteins in fish is about 5-15% higher than plant sources. Fish contain many essential amino acids for human health, such as lysine and methionine. Many fish, especially fatty fish, are a source of long-chain omega-3 fatty acids, which contribute to the growth of nerves and brain in the fetus and ensures mental and visual development, especially during the first 1,000 days of life.



KEY NUTRIENTS IN SEAFOOD:

				
<p>Long chain omega-3 fats Mainly found in fish and seafood, these fatty acids are essential for optimal brain development.</p>	<p>Iodine Seafood is in practice the only natural source of this crucial nutrient. Iodine serves several purposes like aiding thyroid function. It is also essential for neurodevelopment.</p>	<p>Vitamin D Another nutrient crucial for mental development, this vitamin also regulates the immune system function and is essential for bone health.</p>	<p>Iron During pregnancy, iron intake is crucial so that the mother can produce additional blood for herself and the baby.</p>	<p>Calcium, zinc, other minerals Diets without dairy products often lack calcium, and zinc deficiency slows a child's development.</p>

Fish also provide essential body building minerals such as calcium, phosphorus, zinc, iron, selenium and iodine as well as vitamins A, D, and B that help reduce the risk of malnutrition and non-infectious diseases..

Quality and Food Safety Standards:

All basic laws applicable in Yemen with regard to the health regulations during handling and preparation of fishery products for fresh products, as well as frozen fish, canned fish, dried, salted and smoked fish are all based on the laws and regulations of the Food and Agriculture Organization of the United Nations (FAO) and also on the rules of the World Health Organization (WHO) and through Applying the rules of hygienic practice in handling and preparing fish for high quality production and to ensure the quality of the final product, it must be ensured that the technological and hygienic applications in place and the equipment used from fishing to marketing conform to Laws and regulations applicable and in accordance with the required specifications and standards.

With the development of Yemeni fish exports abroad, it was necessary to keep pace with this development in meeting the requirements of the exporting countries, especially the European Community. Yemeni meets the European standards as an integrated system with the previous hygienic conditions and more persistent to maintain the safety and protection of the reputation of the Yemeni products aboard. We can that Yemeni standards and specifications are similar to the EU standards and specifications and currently, all The procedures approved by the European Commission, which supervised the training and qualification of Yemeni cadres in the application of these and requirements set out by the EC are applied and EC has also supervised training and qualification of the Yemeni staff to apply such requirements through conducting many training courses for the ministry cadres as well as technicians in corporations, factories and private sector laboratories in all related to the health conditions for the production and marketing of fish products and their control requirements such as:

- ◆ Determine the minimum health rules for fishery products caught on fishing boats.
- ◆ Determine the quality of water used to process fish products.
- ◆ Detailed principles of physical inspection for detection of parasites in fishery products.
- ◆ Determine the total value of the limits of volatile nitrogen bases for different fishery products and specify the methods of analysis to be used.
- ◆ Determination of reference methods for the detection of heavy metal waste.
- ◆ Application of (HACCP) system for all facilities, factories and fishing boats Labs.





The Role of Fish in Improving Nutrition for Children and Mothers:

Foods produced by the aquatic environment play a special role in nutrition as a source of long-chain omega-3 fatty acids, eicosapentaenoic acid (EPA) and ducosaha cyan cyanate (DHA), which are important for the optimal development of the brain and nervous system of children. Consequently, fish consumption is particularly important during pregnancy and the first two years of life (1000-day window), while many vegetable oils provide an alternative source of omega-3 fatty acids, alpha-linolenic acid that must be transformed, for example, into (DHA). However, this transformation is not done with a high efficacy in our bodies, making it difficult to rely only on vegetable oil during the most crucial periods of our lives. Recent study by FAO and WHO experts suggests that the presence of fish in the diet reduces the risk of women giving birth to children below the optimal level of brain and nervous development compared to women who do not eat fish. For optimal development of the brain of children, the daily requirement is only 150 mg, and there is increasingly convincing evidence of the role of DHA in the prevention of mental illnesses, and this is very important, since mental illnesses are increasing significantly worldwide, and in the developed areas of the world, it exceeds the cost associated with mental disorders associated with coronary artery disease and cancer in combination.

Fish consumption also has health benefits for adults. There is a strong evidence showing that fish consumption, especially oily fish, reduces the risk of death from coronary heart disease. Coronary artery disease is a global health problem affecting increasing numbers of people in developing countries. It is estimated that due to the long-chain omega-3 fatty acids mainly found in fish and fishery products, fish consumption reduces the risk of death from coronary artery disease by 36 percent, and aquaculture products are a major source of long omega-3 fatty acids. Series. 7. The daily intake of 250 milligrams per adult of acidic (EPA) and (DHA) gives optimal protection from coronary artery disease.

There is more attention paid on fish products as a source of micronutrients such as vitamins and minerals. This is particularly true for small-sized species which eaten complete with their head and bones, which may be an excellent source of many essential minerals such as iodine, selenium, zinc, iron, calcium, phosphorus and potassium, as well as vitamins such as vitamin A and D, and several vitamins from the group. B. Significant differences can exist between one type and another and between different parts of the fish itself. The unique nutritional composition of fish is not only due to fatty acids, amino acids and micronutrients (vitamins and minerals); studies of other lesser-known nutrients such as taurine and choline show potential additional health benefits. Although fish is an excellent source of protein, but what makes fish truly unique nutrient is all the additional nutrients it can contain in large quantities.

Types of Fish Resources in Yemeni Waters:

			
Crustacea	CEPHALOPODAE	Surface Fish	Benthic Fish
Coas Tal shrimps Deep sea shrimp Rock Lobster Deep sea Lobster	Cuttlefish Sea Cucumber	Sardine Tune King Fish Meckerel Anchovie	Antak Horse Mackerel Scavenger Barracuda Rock Cod Shark Ribbon Fish Lizard Fish Cat Fish

Fish Farming in Yemen: Reality and Hope:



Fish production is an essential pillar to fill the food gap in animal protein production. Attention on diversifying fishery production resources became an urgent and necessary matter as one of the renewable sources if it is optimally utilized and maintained to ensure food security and socio-economic development of the population. Hence, fish farms is important as another source to enhance production from natural resources, reduce overfishing and preserve fish stocks.

Why fish farming?

It has already been proved that the unit area of fish farms produces more than ten times that of natural fisheries, which encourages a serious trend towards this type of investment in the fisheries sector.



Yemen is one of the countries that tremendously depend on fisheries as an important source of national income after oil.



Thus, government seeks to maintain the fishery stock through rationalize the catching processes and develop fish farming to increase the production and maintain the environmental balance of this wealth and the development of the sector to promote sustainable development, support the national economy and promoting nutrition, jobs creation, poverty alleviation and unemployment. In order to sustain fisheries, fish farming should be introduced as a key component in the sustainable development of fishery resources, according to recent studies and recommendations of international organizations such as the Food and Agriculture Organization of the United Nations (FAO) and other international bodies and organizations concerned with fisheries.



Yemen has, according to studies, vast sites along the coastline suitable for fish farming, however, investment in the establishment of fish farming projects in Yemen is very weak, where there are only two fish farms, one for shrimp farming and

other for integrated fish farming, all of which are successful and of great economic feasibility.

- 1- Ba Muslem farm for shrimp farming in Hodeidah governorate is owned by the private sector with a production capacity of 500 tons per year.
- 2- A newly established farm in Hadramout owned by the private sector with a production capacity of 600 tons during the first year of production
- 3- Implementation of a number of basins for integrated farming in plantation production farms, such as Almutareb farm in Bagel district, which had an economic and productive impact of the crops and feed related to farming and recycling of basins waste in order to fertilize the plants in the farm and this had a significant impact in increasing plant production, which is one of the successful experiences in this area which should be expanded and circulated to all owners of plant farms.

The Ministry of Fisheries seeks to develop farm fishing through the establishment of the institutional framework to manage, organize and expand the establishment of fish farming projects due to its significant role in increasing fish production and contributing to the promotion and raising the level of nutrition. The plan of the fisheries sector, within the multi sectoral plan, aimed at raising the level of nutrition in Yemen focused on developing the fish farming side through conducting a number of specialized studies and implementing two model farms in Hodeida and Aden governorates in order to encourage the private sector to invest in this aspect.



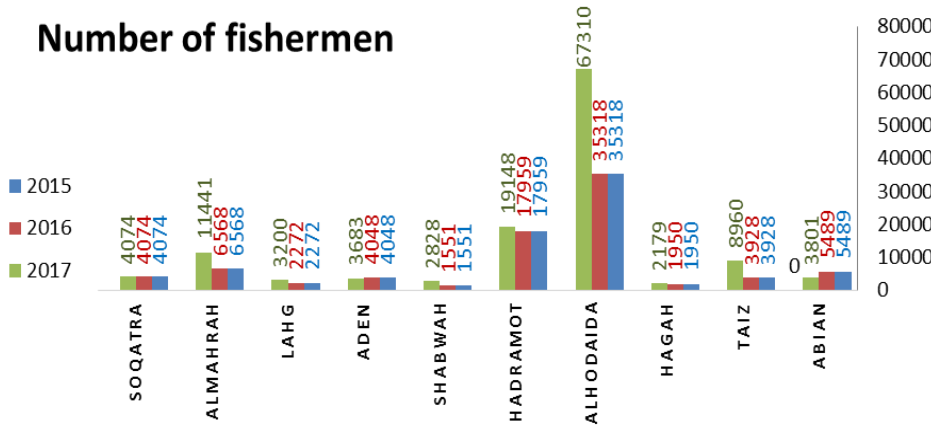
Fish farms - models from the world



Fisheries Associations and Cooperatives:

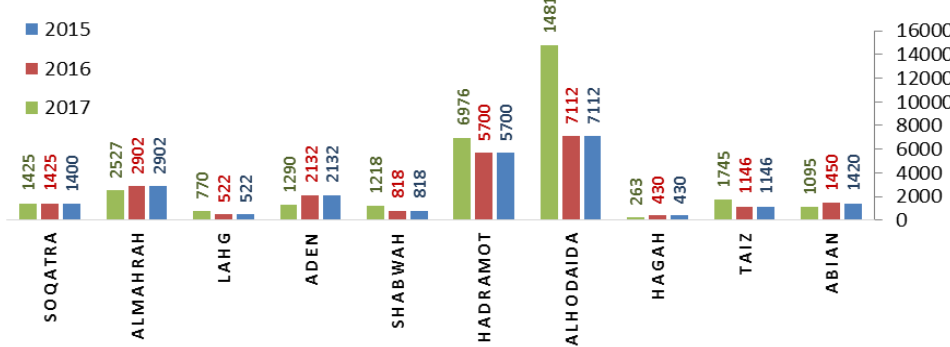
The cooperative work for fisheries workers is an urgent need due to the nature of the profession risks. The fishery cooperatives represent the institutional frameworks that contribute to the development of traditional fishing, infrastructure management, service to fishermen, increase fish production and marketing, and contribute to the development of coastal communities due to the facilities provided such as fishing equipment, maintenance and marketing services. Fisheries associations play an important role in the field of marine inspection and control through formation of marine committees of fishermen elder people to identify issues related to the preservation of the environment and protection of fortunes and its resources from damage and irregularities, in addition to local customs and regulations adopted by the fishermen, which achieves a positive status towards accountability. The biggest role, within the task of marine control and inspection, lies with the fisheries associations and fishermen due to their presence along the coastal line of the Republic of Yemen and the cooperatives and fishers are the first to encounter and report the violations and damages.

Number of fishermen

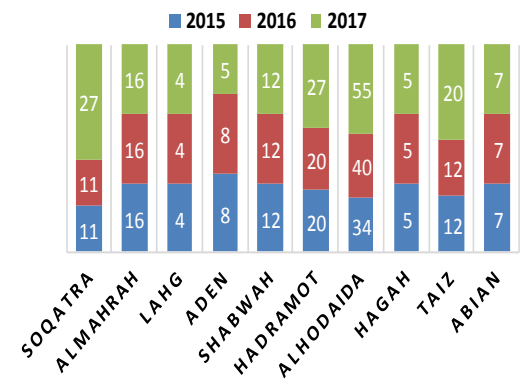


Fisheries cooperative work has witnessed a remarkable growth, where the fish cooperative societies spread along the coast and the Yemeni islands, their number has raised from (15 fishery cooperatives) In 1990, to 135 cooperatives in 2017, and the number of fishermen affiliated to fish cooperatives increased to 76,000.

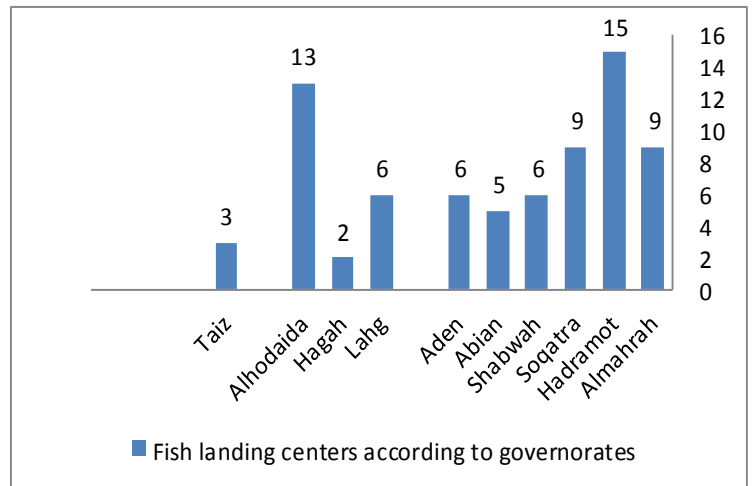
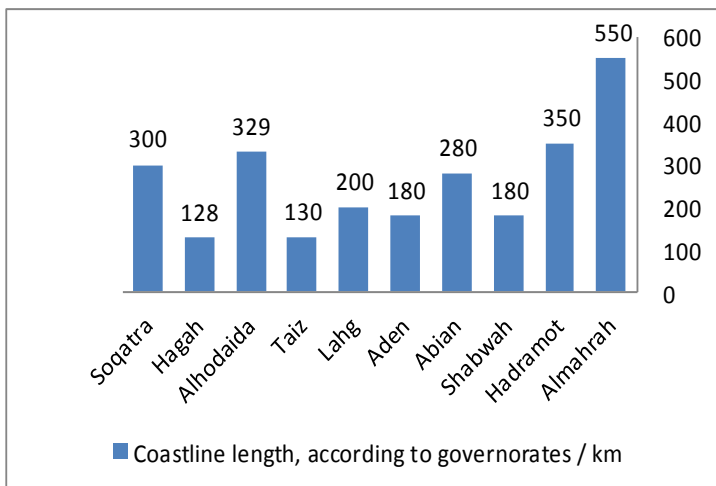
NUMBER OF BOATS



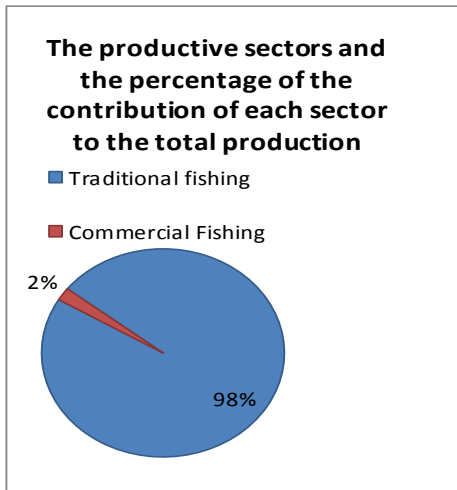
NUMBER OF FISHERMEN



Number of landing centers and the length of the coastal strip of the Republic of Yemen



Producing Sectors:



Investment Fields And Opportunities in Fishery Sector



Fish Marketing System:

Fish is a consumption commodity that can be marketed to the end consumer or to a factory where its nature changes industrially and then marketed again to the end consumer, in order to meet the material needs of society in the production of goods and services that are accepted by the consumers and acceptance depends on the right price and the right quality. Marketing method of the Marine lives in the Republic of Yemen depends on three main components namely wholesale, retail and export.

Wholesale :-

All traditional fishing products are put for landing centers and auction sites. The sale process is carried out by the auctioneer. Purchaser compete to get the production and whoever provides the best price, he will get the production and after the approval of the fisher on the price officer The marine lives go directly to the local market or to the processing plants, fish processing and canning factories, or goes to the markets of neighboring countries directly through land ports.

Retail: -

Retailing takes place in large fresh fish retail markets. These markets are managed by the local authorities in the governorate where the market is located, in addition to fish sale in specialized retail stores.

Export: -

Fisheries are exported directly to nearby markets, where the owner of the car (buffer) put the fish with ice in plastic boxes and stack them in the car and then transported directly to the external market.

Internal Marketing: -

Internal marketing depends on wholesale and retail.

Wholesales are in large markets dedicated to wholesale fresh fish. These markets are supervised by local authorities in the governorate where the market is located.

External Marketing: -

External marketing is carried out through land border of (Haradh) or by sea through one of the main ports of Aden, Hodeidah, Mukalla and by air transport through the airports of Sana'a, Aden and Mukalla. After purchasing marine lives from one of the auction sites, some traders set and stack marines lives in plastic boxes with sufficient ice. Then, they are shipped on insulating cars and transported through the land ports of neighboring countries.

Fish companies also purchase marine lives from auction sites and transfer them to fish processing plants or to fish canning plants. Aquaculture processing is carried out and fresh quantities of whole fish or fish fillets are exported directly through an airport after obtaining a health certificate from the Ministry of Fisheries against payment of (1%) of the value of the quantities to be exported, by such companies. Regarding frozen aquatic lives, they are exported through one of the ports after the above mentioned procedures.

Damage to the Fisheries Sector as a Result of the Ongoing War on Yemen:

The fisheries sector is one of the largest economic sectors that was heavily affected by the ongoing war in Yemen, which cast a shadow on this sector and targeted all infrastructure in general, ports and landing and export centers in particular, along the western coastal strip of the Red Sea where the landing sites were destroyed by direct targeting besides besieging fishers and targeting their boats and prevent them from fishing and closure of the export outlets, which caused them great losses due to the high cost of fishing trips and low prices, which caused significant losses to the national economy as the fishery sector is the second pillar after the oil sector in addition to natural disasters suffered by most fish sites in the eastern governorates and Socotra archipelago as a result of climate change, which led to frequent storms and hurricanes in close periods.

Summary of direct and indirect material losses to the fisheries sector in the Red Sea due to the ongoing war:

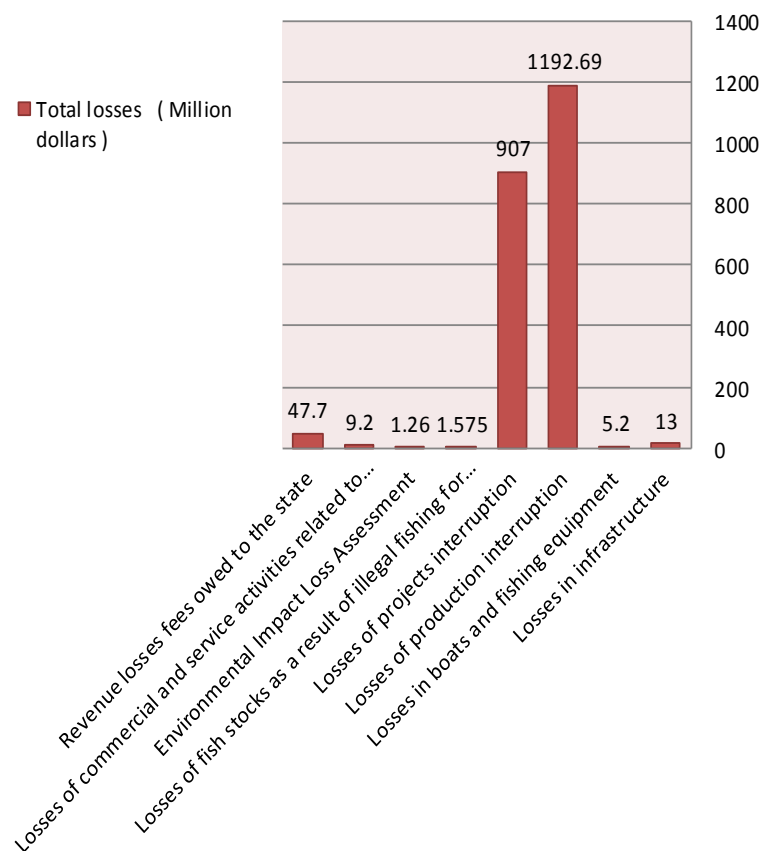
- ◆ Destroy 14 fish landing sites.
- ◆ Damaging laboratories and fish complexes.
- ◆ Destruction of 230 fishing boats
- ◆ 4586 boats are out of order.
- ◆ Some 37,000 fishers lost their jobs and many residents abandoned their coastal villages and prevented them descending into the sea and confiscating their tools.
- ◆ Lack of local funding for fisheries sector activities

The Ministry's Efforts to Promote Livelihoods:

The level of risks in coastal areas has risen to the emergency phase. Ministry of Fisheries seeks to Implement a package of priorities that have been included within a strategic plan that absorbs all phases starting from the phase of steadfastness and recovery to expand jobs opportunities and income for all fishers to achieve a sustainable income that enable them to ensure development tools in order implement other strategic phases aimed at restoring infrastructure and revitalizing the economic cycle, and to provide livelihoods to coastal populations in order to make them less vulnerable and more resilient to economic shocks. Interventions include:

- ◆ Compensating fishers ,whose boats have been damaged, and providing them with fishing tools such as nets ,boats and repairing the damaged ones.
- ◆ Assist the most vulnerable families on the coast, including women.
- ◆ Support livelihoods related to income and food production.
- ◆ Increase support of public works programs to employ young people in infrastructure and develop their skills to use modern equipment, conservation, refrigeration, transport and marketing.
- ◆ Cooperation with international organizations to overcome funding crisis, which still needs to raise the level of coordination, cooperation and partnership. Multip-sectoral nutrition plan is one of the key mechanism adopted by the Ministry to mobilize fund and building capacities of the fishery sector.

Total losses (Million dollars)



References: - Ministry of Fisheries