Status of Commercial Fisheries in the Kingdom of Bahrain

Thamer S. Ali and Asma A. Abahussain

Program of Environment Sciences and Natural Resources, College of Graduate Studies, University of Arabian Gulf, Kingdom of Bahrain.

Abstract. The present paper is concerned with annual catch of commercial fisheries in the Kingdom of Bahrain 2004-2009 based on landing statistics provided by the General Directorate for the Protection of Marine Resources. The Bahrain's fisheries are categorized into three fishing grounds; Northern, Eastern and Western areas. The northern area comprised the majority of the total fisheries accounting, as overall, 51.3% followed by the eastern area (38.7%) and the lowest from the western area (10%). In the northern area, the finfish fisheries forming 59.4% over the period 2004-2009 followed by shrimp fisheries (17.1%) then crab fisheries by 12.2%. The eastern fisheries showed that the crab fisheries formed the majority of the catch with an overall percentage 44.6%, followed by finfish fisheries (34.4%) and then shrimp fisheries (15.0%). However, in the western area, the results obviously revealed that finfish fisheries largely forming 60.8% of the total catch, followed by crab fisheries (29.1%), whereas the shrimp fisheries constituted 5.6%. The annual catch of six most commercial finfish species (Rabbit fish; *Siganus canaliculatus*, Groupers; *Epinephelus coioides*, Spangled Emperor; *Lethrinus nebulosus*, Spanish Mackerel; *Scombermorous commerson*, Doublebar Bream; *Acanthopagrus bifaciatus* and Grey Grunt; *Plectorhinchus sordidus*), shrimps; *Penaeus semisulcatus* and crabs; *Portunus pelagicus* have been investigated at each fishing ground and the average price rates were described. Generally, the results showed a decrease trend for commercial catches over the investigated period synchronized with noticeable increase in price rate. As a result of deterioration in fish stock due to overfishing and increasing in population growth rate by ~ 7% during 2000-2010, the per capita fish consumption substantially declined to less than 10 kg/year in 2009 in comparison with ~25 kg/year in the 1980s.

Keywords: Finfish, Shrimps, Crabs, Fish per capita, Bahrain.

Introduction

Fisheries are vitally important to global livelihoods and food supplies. The concerns of consumers and fishers are the axial of a number of topics examined in the FAO technical reports on the state of world fisheries and aquaculture. Over 30 years ago, the landings of wild fish have leveled off and many fish stocks are fished so heavily that their future is threatened. However, the world's appetite for fish has continued to increase, particularly as urban populations and incomes grow in developing countries, indicating the necessity of sustainable exploitation as a desirable goal for both natural fisheries and aquaculture operations (8).

Long term data shows that global per capita fish consumption has risen steadily from just under 14 kg/pa in 1990 to about 16.5 kg/pa in 2005. This trend is forecast to continue, reaching 19.1 kg/pa by 2015 (10). The upward trend in global marine fish catch seems to attained it's maximum level, and starts to drop down, indicating that the maximum potential yield of the world marine capture fisheries has been at it's critical point. On the other hand, the world's population has increased even more quickly than the total food fish supply. As a result the world per capita food fish supply increased from an average of 9.9 kg in the 1960s to 18.4 kg in 2009, and preliminary estimates for 2010 point to a further increase in fish consumption to 18.6 kg (8). Moreover, the FAO has forecast that total world consumption of fish, will increase by more than 25% to 179 million tons by 2015 in which the annual demand will exceed annual supply by an amount of 5.2 million tons. (16).

Fisheries provide a source of income, employment and recreation at the same time as contributing to the cultural heritage of the inhabitants in the Kingdom of Bahrain. The fish resources and habitats remain increasingly threatened by various stressors such as dredging / reclamation, fishing operations, and industrial effluents. Of all the environmental impacts, overfishing poses by far the greatest environmental threat representing a major adverse stressor to fisheries productivity in the Gulf Co-operation Council Countries (GCC) region. There is historical evidences of overexploitation and stock declines of many commercial species in the Arabian Gulf and Bahrain as well for which assessment status is still either unknown or of limited knowledge at the time of greatest exploitation. Accordingly, a decree No. 20 in 1996 was issued to regulate the exploitation of the fishery resources in the Kingdom of Bahrain.

Bahrain's fishery is a multigear and multispecies. The fishing sector in Bahrain is described in details by (4). It is divided into two sectors; artisanal and industrial. The industrial sector represented by shrimp trawlers developed as a result of successful shrimp trawling in 1966. In 1997, the Ministerial Decree (No.7) was issued to terminate finfish trawling by industrial steel trawlers in Bahrain, which were banned on 1st June 1998 (13).

The aim of the present paper is to highlight the status of most commercial fishery species and per capita fish consumption in the Kingdom of Bahrain, to address the pressures and action to be taken sustainable exploitation to control subsidies.

Methodology

The present paper is based on fishery landing statistics in Bahrain documented by the General Directorate for Protection of Marine Resources including the total catch produced by all fishing gears (traps, wooden shrimp trawlers, gill nets and hook and line). Bahrain is a group of 35 islands situated on the southern coastline of Arabian Gulf. Flanked by Saudi Arabia on its western and southern sides and Qatar peninsula on its eastern. Bahrain has a total land area of only 706 km^2 and total coastline 590 km. Bahrain's sea area is about

10,000 km^2 (17). The total area of Bahrain fishing grounds illustrated in Figure (1) is approximately 3850 km^2 (14). It is categorized into three areas; North (57.1%), East (26%) and West (16.9%).

The northern fisheries is located in open area extending from the northern shores until international borders characterized by deeper waters suitable for large wooden fishing vessels (locally known Banoosh). This area includes important pearl fishery grounds locally known Hayrates like Hayr Abu al Thamah, Hayr Abu Amamah and Hayr Shtayyeh in addition to Fasht Al-Jarim and Khor Fasht (6). The eastern fishing ground is shallow characterized by largest Fasht (mosaic habitat locally known Fasht) known Fast Al-Azm of approximately 108 km^2 in the center of this region. There are another Fasht habitats; such as Tighaylib, Umm Jalid and Hawar Island in the south as a protected area. Sandy and muddy bottoms are distributed within these fashts representing shrimp nursery and spawning grounds (14). The western fishing ground extends from the Umm an Na,san Island to Ra,s al Barr and is characterized by its small area and high salinity gradient, as a result it has become of a low productivity compared to the other two fishing grounds (14).

The data provided by the General Directorate for the Protection of Marine Resources have been analysed into the followings to describe the fisheries status in the Kingdom of Bahrain:

- Total landings by each fishing ground during 2004-2009.
- Annual landings by commercial fishery groups (fin fish, shrimps, crabs and others) at each fishing grounds. The later includes cuttlefish, jellyfish, ray and sharks and lobster.
- Annual fluctuations in landings of most commercial species those presented in Table 1.
- Per capita fish along the 30 years ago to assess the fishery supply-demand trend in comparison with global level and to evaluate to which extent constitute the healthy requirement ratio.

Based on nutritional value according to World Health Organization, the protein requirements is estimated to be 0.7 g/kg/body weight/day. Theoretically, fish food are considered to support 50% of this rate, i.e., the ideal amount derived from fish equal 35 kg to achieve optimum nutrition value of protein requried on healthy basis. This rate as well as the global average per capita (18 kg/year) have been adopted to estimate the shortage/redundant of fish supply in Bahrain.

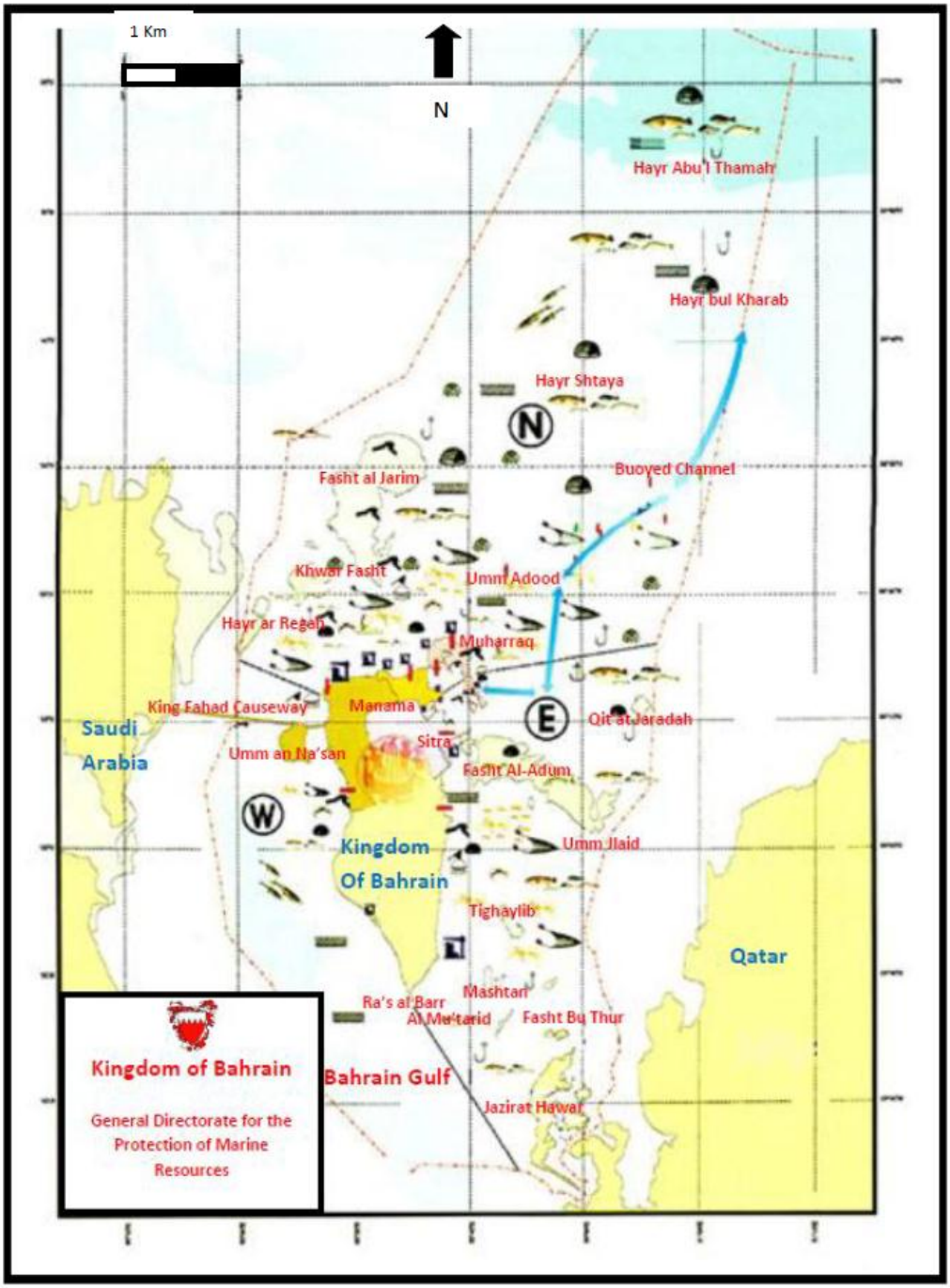

Figure 1. Location map of fishing grounds in the Kingdom of Bahrain.

Table 1. Most commercial fishery species in the Kingdom of Bahrain.

Rabbit Fish *Siganus canaliculatus* (Saffy) 	**Doublebar Bream *Acanthopagrus bifaciatus* (Faskar)** 
Spangled Emperor *Lethrinus nebulosus* (Sha'ree) 	**Grey Grunt *Plectorhinchus sordidus* (Janam)** 
Grouper **Epinephelus coioides* (Hamoor) 	**Shrimp **Penaeus semisulcatus* (Rubian)** 
Spanish Mackerel *Scombermorous commerson* (Chana'ad) 	**Crab **Portunus pelagicus* (Gubgub)** 

*mostly represent by this species

Results

Total Fishery

Depending on the source of the fish landings, the fisheries were categorized into Northern, Eastern and Western areas. As illustrated in Figure 2, the northern area comprised the majority of the total annual fisheries accounting, as overall, 51.3% followed by the eastern

area by 38.7% and the lowest from the western area by 10%. The northern fisheries showed slight increasing toward 2009. In eastern fisheries, the results revealed that the highest catch has been recorded in 2007 and the lowest in 2005. However, no real changes observed for the western fisheries. Generally, the catch in 2005 was the lowest for the three areas.

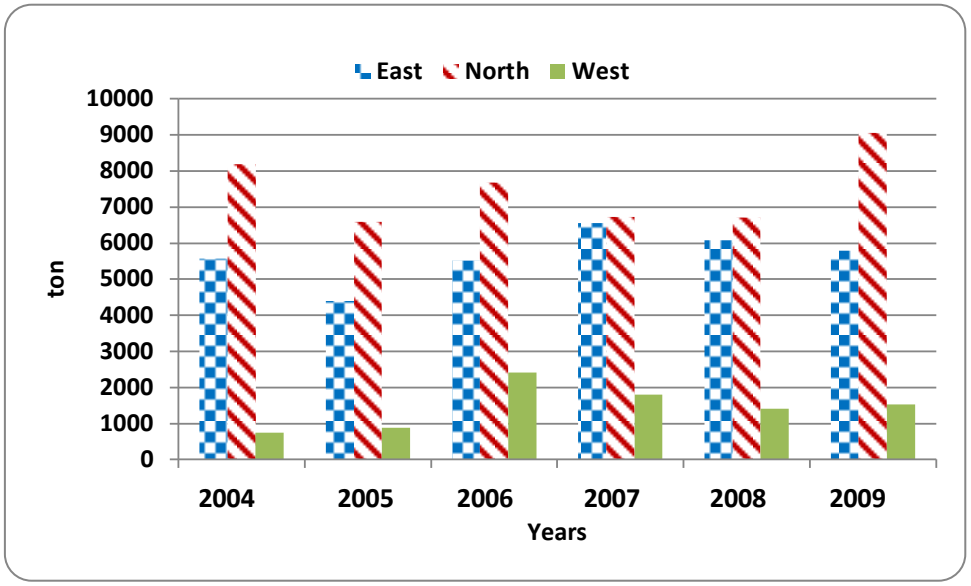

Figure 2. Total catch per fishing grounds in the Kingdom of Bahrain.

Main Fishery Groups

The northern area was contributed the majority of finfish fisheries forming 59.4% over the period between 2004-2009 followed by shrimp fisheries (17.1%), then crab fisheries by 12.2%. The finfish fisheries experienced a decline after 2006, which coincided with an increase in shrimp fisheries contribution, however the crab fisheries have not showed real annual changes as shown in Figure 3. Moreover, the catch of other fisheries components showed remarkable increase in 2009, which attributed to a huge quantity of jellyfish constituting 37% of the total catch.

In the eastern area the crab fisheries formed the majority of the catch with an overall percentage 44.6% of the total catch for the years 2004-2009, followed by finfish fisheries by 34.4% and then shrimp fishery by 15.0%. The shrimp fishery relatively increased since 2006 synchronized with relative decline in finfish fisheries, however the crab fishery showed no remarkable changes over the investigated years as presented in Figure 3.

In the western area, the results obviously revealed that finfish fisheries largely comprised the total catch particularly in the years 2006 and 2007 forming 60.8% of the total catch over the years 2004-2009, followed by crab fisheries (29.1%), whereas the shrimp fisheries constituted

5.6% of the total catch. Noticeable increase could be observed in the western area during 2006 in comparison with previous years 2004-2005, however the catch steadily declined in the years after as illustrated in Figure 3.

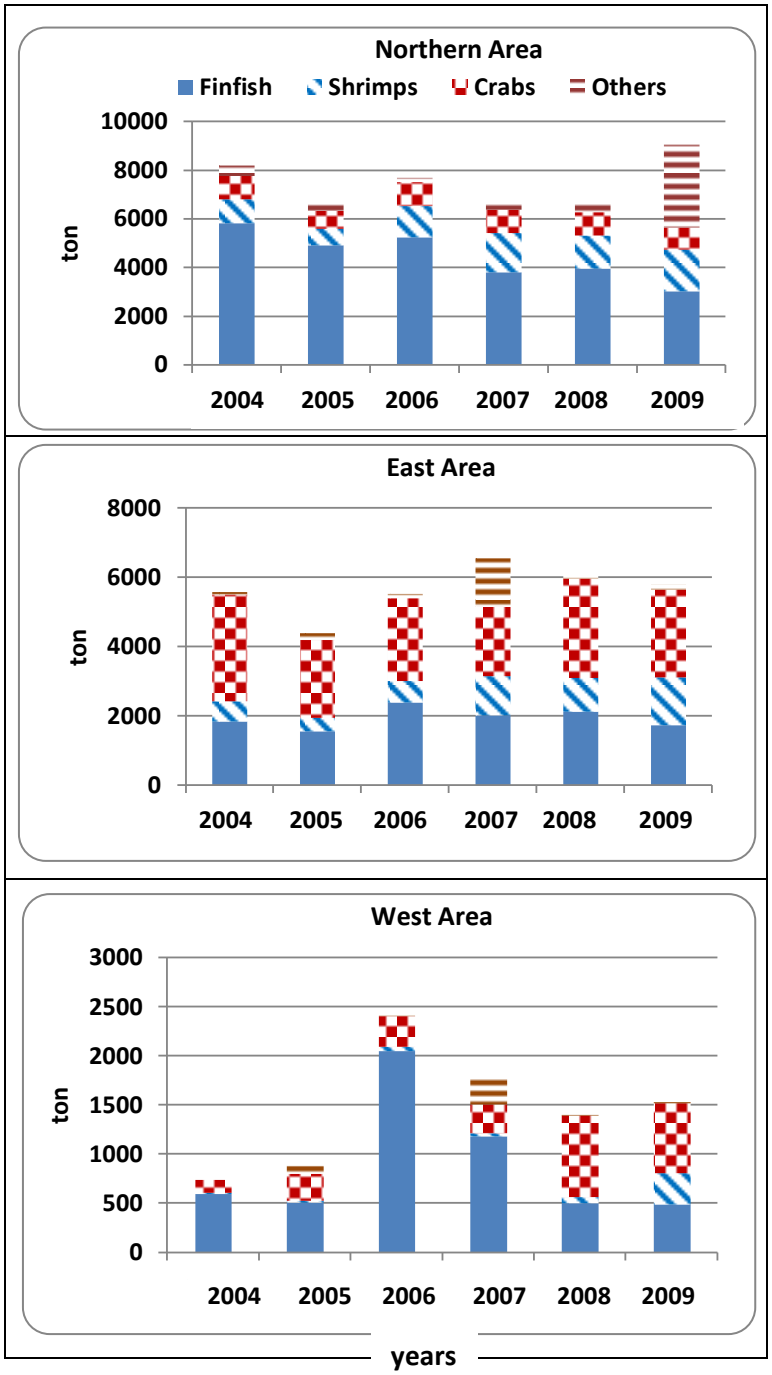

Figure 3. Main fishery groups in the fishing grounds of the Kingdom of Bahrain.

Commercial fishery species

The fishery status of six commercial fin fish species, shrimps and crabs have been investigated during the period 2004-2009. The annual catch at each fishing ground and average of price were described.

Shrimp *Penaeus semisulcatus* (Rubian)

The majority of the catch is represented by species *Penaeus semisulcatus*, however the shrimp fishery in Bahrain includes another five species but those are of less marketable value. The results showed that most of the shrimp catch is sourced from the northern area, which form 58% followed by the eastern area by 38%, however the west shrimp catch was less than 5%.

Figure 4 shows an oscillation pattern with increase tendency in the shrimp fishery in the three areas during 2004-2009, which was accompanied by changes in price ranging between 2.1 and 3 dinars per kilogram.

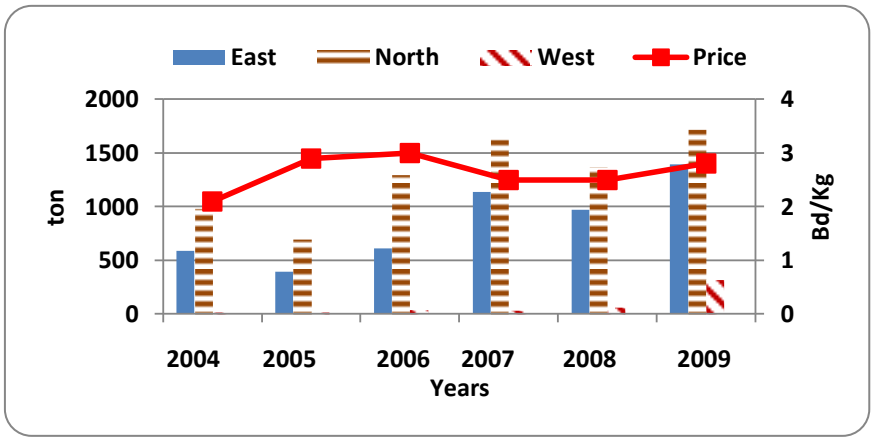

Figure 4. Shrimp fishery status in the Kingdom of Bahrain.

Rabbit Fish *Siganus canaliculatus* (Saffy)

Most catches of this species was from the eastern and northern areas constituting 50% and 46% of the total catch respectively, however the western area was characterized by marginal contribution (4%) as shown in Figure 5. The highest annual catches was recorded from the eastern area in 2006 (1,343 tons). A gradual increase observed in the price from 1.8 to 2.6 dinars per kilogram.

Groupers *Epinephelus coioides* (Hamoor)

This group mostly represented by orange spotted grouper *Epinephelus coioides*. The western and northern areas comprised the majority of groupers fisheries contributing 43% and 42%

respectively. However, the catch from eastern area has not exceeded 15%. Generally, the grouper substantially declined during recent years, where the catch dropped from 336 tons in 2004 to 57 tons in 2009 at the northern area as presented in Figure 6. This coincided with a significant increase in the price attaining its peak in the year 2009 where the price jumped up to 3.4 dinars per kilogram doubled to the price in 2004 (1.7 dinars per kilogram).

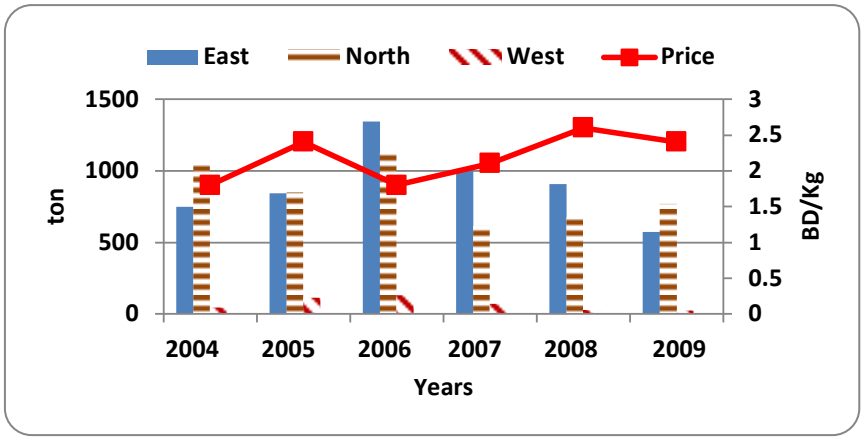

Figure 5. Rabbit fish fishery status in the Kingdom of Bahrain.

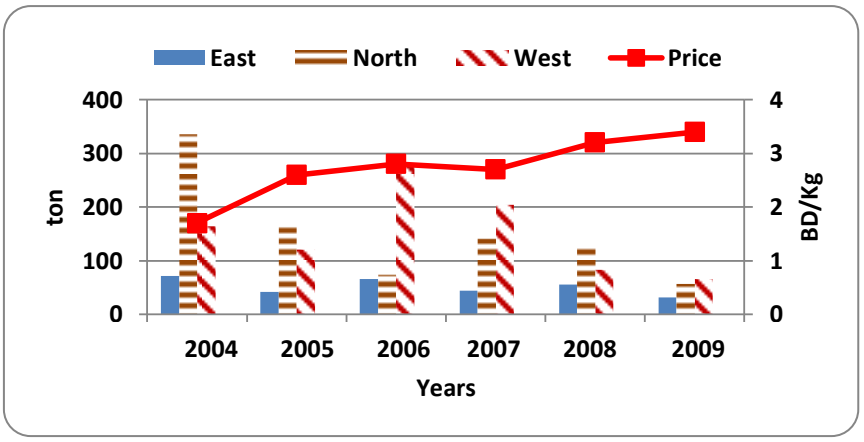

Figure 6. Groupers fishery status in the Kingdom of Bahrain.

Spangled Emperor *Lethrinus nebulosus* (Sha'ree)

The catch of this species mostly concentrated in the northern area, which accounted 91% of the total fisheries, however the catches of the other two areas have not exceeded 125 tons / year in the eastern area and 30 tons / year in the western area (Figure 7). A sharp decline has been noticed, where the catch was noticeably decreased from 1,725 tons in 2004 to 400 tons in 2009 in the northern area synchronized with an increase in price rate from 1.1 dinars per kilogram in

2004 to 1.5 dinars per kilogram in 2009.

Spanish Mackerel *Scombermorous commerson* (Chana'ad)

The fisheries of this species are also mostly sourced from northern area forming 90% of the total catch. The annual catch results of northern area revealed that the catch largely dropped during the investigated years from 157 tons in 2004 to 11 tons in 2009, which obviously reflected on price that increased up to 3.3 dinars per kilogram in 2009 compared with 2.0 dinars per kilogram in 2004 (Figure 8).

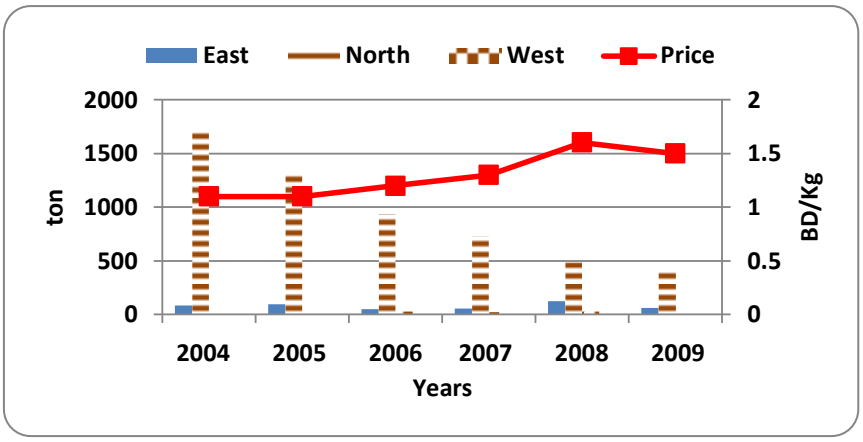

Figure 7. Spangled emperor fishery status in the Kingdom of Bahrain.

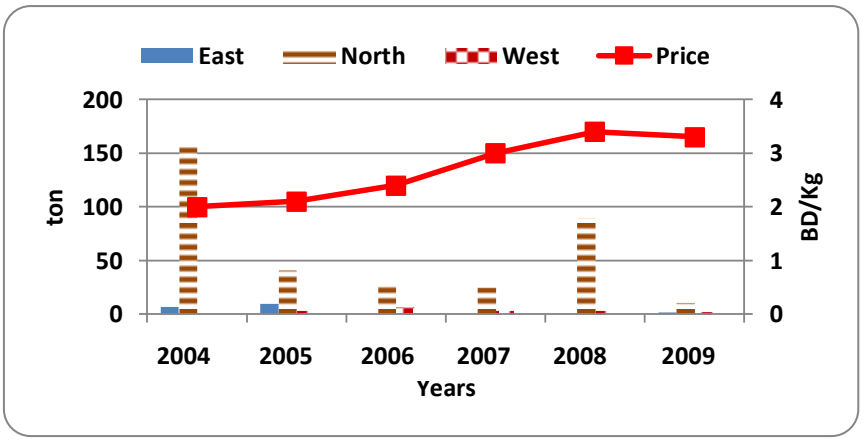

Figure 8. Spanish mackerel fishery status in the Kingdom of Bahrain.

Doublebar Bream *Acanthopagrus bifaciatus* (Faskar)

The northern area represents the majority of the fisheries for this species contributing 84% of the total catch. An oscillation could be noticed in the northern fisheries of this species during

2004-2009, where the quantities showed two peaks; the minor was in 2006 (128 tons) and the major was in 2008 (165 tons) followed by a lowest level in 2009 (65 tons) as illustrated in Figure 9. Despite such fluctuations, the price exhibited an increasing pattern up to its maximum 1.4 dinars per kilogram in 2008-2009 in comparison with 1.0 dinars per kilogram in 2004.

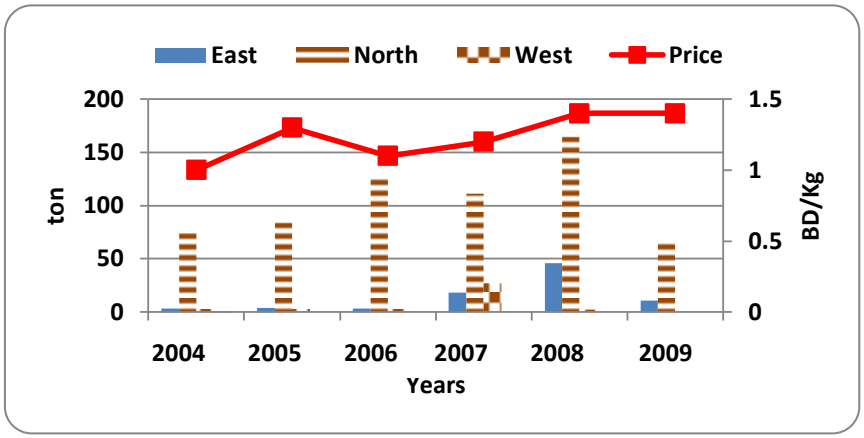

Figure 9. Doublebar bream fishery status in the Kingdom of Bahrain.

Grey Grunt *Plectorhinchus sordidus* (Janam)

The three fishing areas seem to contribute the fisheries of this species in different rates with tendency to eastern area, which forming largest contribution (47%), followed by 34% from northern area and 19% from western area. The fisheries of this species in the eastern area showed fluctuation pattern, however the pattern at northern and western areas showed a decrease trend (Figure 10). As observed in other species the price rate was annually increased from 1 dinars per kilogram in 2004 to 1.8 dinars per kilogram in 2009.

Crab *Portunus pelagicus* (Gubgub)

This group mostly represented by species *Portunus pelagicus*. The results showed that the eastern area largely support the crab fisheries by 65%. No real changes could be noticed in the annual catch for the northern fisheries of this group, while the fisheries of western area relatively increased during 2008-2009 (Figure 11). As a result the price rate seem to be stable around 1 dinars per kilogram.

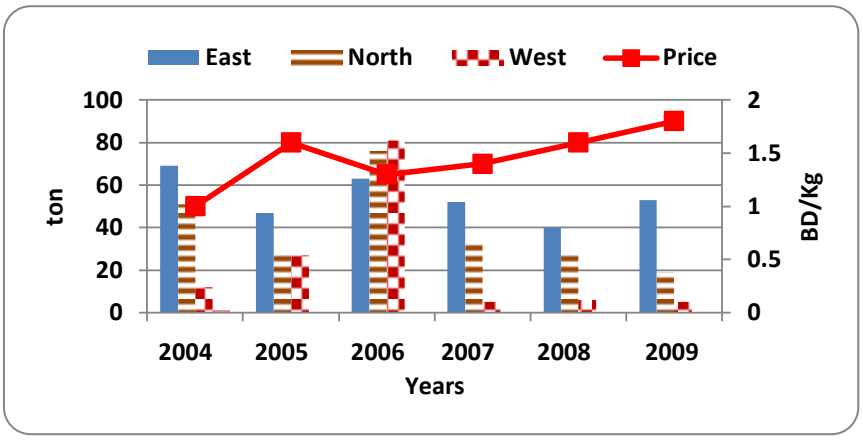

Figure 10. Grey grunt fishery status in the Kingdom of Bahrain.

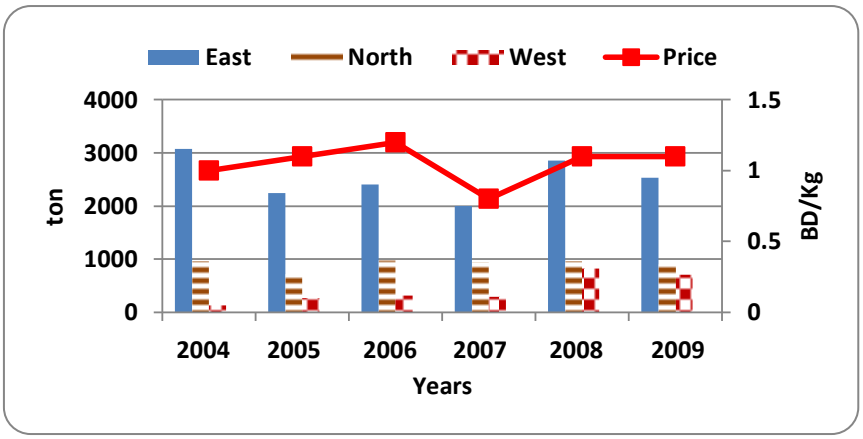

Figure 11. Crabs fishery status in the Kingdom of Bahrain.

Per Capita (Kg/person/year)

Figure 12 illustrates the changes in the rate of annual per capita fish in Bahrain compared with the global average. A gradual decline could be concluded along the 30 years since 1980. The first half of 1980s showed an increasing pattern up to 1985 where the rate attained 27.5 kg/capita/year followed by a steady decline, except little improvements for few years in between, dropping to its lowest level in 2008 and 2009 in which the per capita obtained were 7.4 and 8.5 kg indicating a shortage by 10 kg in comparison with global rate in these two years where the per capita achieved were 17.8 and 18.1 kg/year respectively. It appears that the global rate of per capita has slightly fluctuated over the last 30 years ranging between 16 and 20 kg.

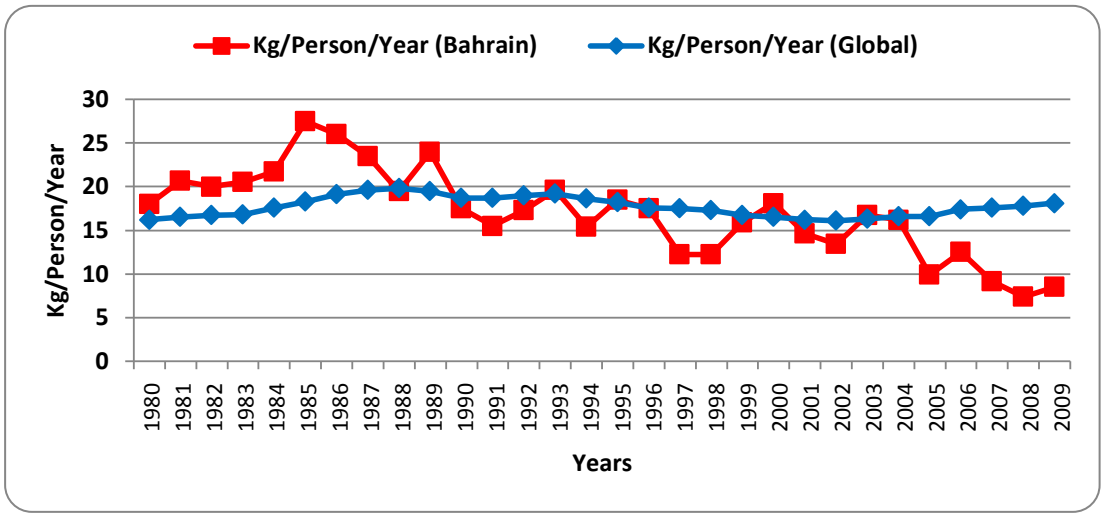

Figure 12. A comparison of fish per capita in the Kingdom Bahrain and global rate.

Figure 13 clearly present the shortage in fish supply to meet the demand basing on global rate (blue area). Depending on optimal rate for nutritional value, the results showed a big gap (green area) in the amount of fish to achieve this rate.

As presented in Figure 14 on the shortage/ redundant supply trend as a decade average, it is found that there was a redundant in fish supply by 1,659 tons in Bahrain during the 1980s basing a per capita global average. However, in the 1990s the supply trend was decrease showing a shortage by 1,107 tons which has been doubled to 4,377 tons during the period 2000-2009. On the basis of optimal protein rate for nutritional , the shortage found to be 5,000 ton in the 1980s and the gap doubled to 10,000 tons in the 1990s nineties and continues to 20,000 tons in the first ten years of the third millennium.

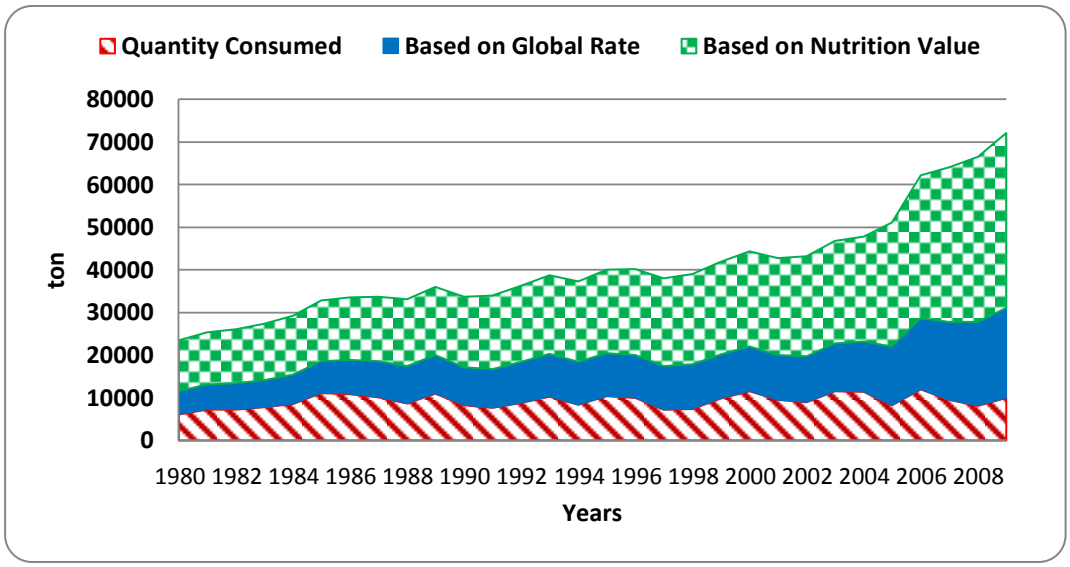

Figure 13. Shortage / redundant trend of fish supply in the Kingdom of Bahrain.

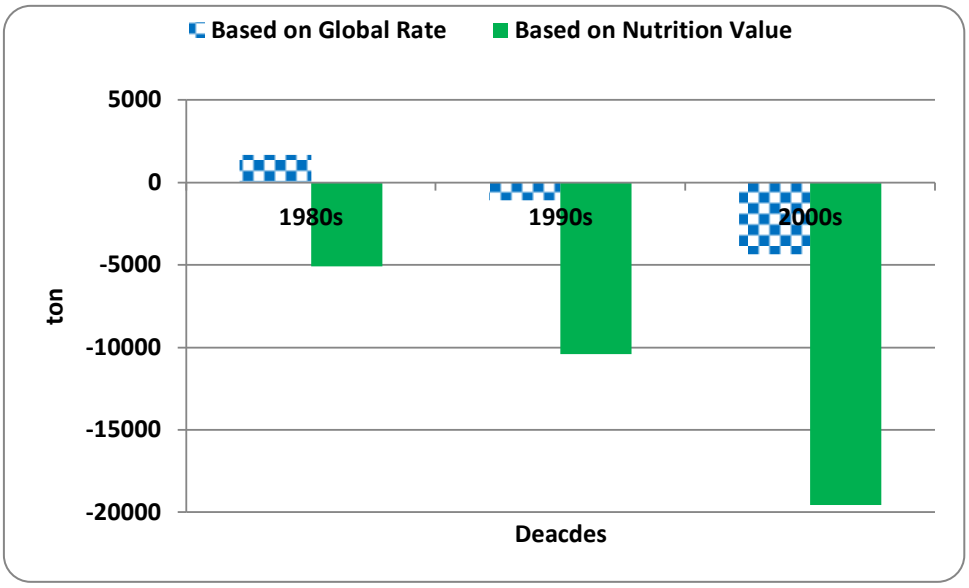

Figure 14. Shortage/redundant of fish supply in the Kingdom of Bahrain on decade basis.

The fish quantity required to meet the fish demand during the next 20 years since 2010 was assumed by adopting the average of global rate of per capita during the 30 years ago (18 kg/year). The assumption is based on population growth rate 7.12%, derived from the average of population growth rate during 2000-2010. The fish quantities need to be supplied

to achieve the optimum protein rate were also estimated basing on the rate 35 kg/person/year. The estimates showed that the fish meat required whether from local fisheries, aquaculture or import quantity is 31,900 tons, 44,993 tons, 63,460 tons and 89,506 tons for the years 2015, 2020, 2025 and 2030, respectively. The expected fish quantity to be supplied is approximately 89,506 tons to achieve the average 18 kg per capita and 174,040 tons to achieve the optimum protein rate as an indicator of nutritional value.

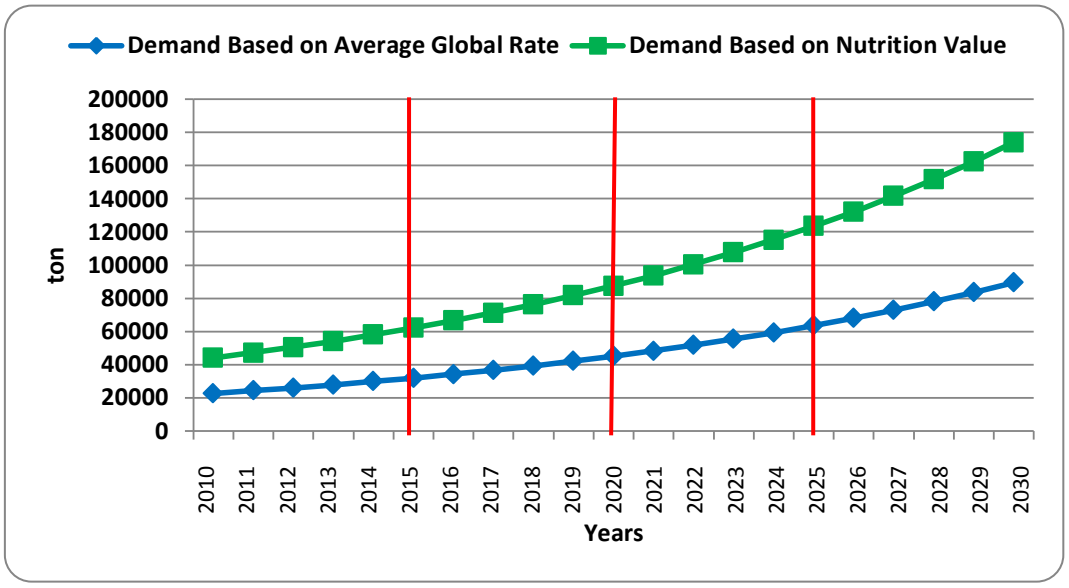

Figure 15. Assumption demand on annual fisheries for the upcoming 20 years in the Kingdom of Bahrain

Discussion

The basis of marine resource and fisheries law in the Kingdom of Bahrain is the 1981 Amiri Decree on fisheries. In addition to the 1981 Amiri Decree, various ministerial decrees have been issued as necessary (18). Annually, ministerial decrees are issued on close and open the shrimp-fishing season. Other ministerial decrees have been issued to clarify or specify issues presented in the 1981 Amiri Decree. Recent decrees issued in March 2013 to emphasize on closed season for both shrimp and crab catches. Since 1994, the hatchery at National Mariculture Center (NaMaC), established in 1979, has routinely produced hundreds of thousands fry of Blackfin Sea-bream *Sparidentex hasta*, Grouper *E. coioides* and Rabbit fish *S. canaliculatus* (2 and 3). Approximately, two hundred thousand out of the fry produced are used to support the yearly fish release program (11). Moreover a creation of artificial reefs project has been initiated in 2012 and initial steps are on the road to supplement fish protein by aquaculture. Although a range of these policy measures undertaken, per capita fish consumption has been sharply dropped mainly due to

overexploitation and loss of spawning and nursery grounds as a result of continuous dredging /reclamation activities. (6) identified overcapacity (too may boats) as the major challenge and constraint on fisheries and marine resources in the Kingdom of Bahrain. For instance, the number of fishing boats has been increased from 605 in 1983 to 1590 in 2004 (15).

Fish consumption patterns have changed somewhat in Bahrain and GCC countries as well due to a substantial foreign labor population. Therefore, considerable quantity imported of non-traditional species to satisfy new consumer demands (9). For example in 2004 data, the per capita was estimated to be 16.2 kg/year, the imported fish contributed an average 7.6 kg/year, while the other 8.6 kg/year was produced by local catch as concluded in the technical report 2006 (14). Similar findings have been reported by (7) on Kuwait fisheries indicating that total catch has declined over time by approximately 25% while imports increased by 62% of the total fisheries production over time.

The shrimp fishery is considered as a vital fishery resource in Bahrain. The shrimp catch is seasonally fluctuated between the northern and eastern fishing grounds following to its spawning migration cycle as described by (1). Accordingly, the fishermen transfer their fishing operations from/to these two fishing grounds particularly during April-May and September-October. Although four months closed season (mid March to mid July), the shrimp fishery stock is substantially decreased in comparison with 1980s and 1990s due to excessive fishing effort represented by continuous increasing of fishing boats, which approximately are over 500 boats. The shrimp stock will be more destructed to serious consequences in the near future in case of no strict decision taken to limit the fishing effort to give the opportunity for the stock to restore. On the other hand, shrimp trawlers have considerably affect the marine habitats, as a result of dragging trawl net supplemented by heavy chain across the seabed, leads to significant levels of non target species as by-catch and substantially disturbs seabed ecosystem (5). No attempt has been made within the Bahraini territorial waters to identify the shrimp by-catch ratio and the impacts of shrimp trawlers on seabed environment. To maintain the shrimp stock and fishing practices, there is a regional Gulf Cooperation Council (GCC) effort to harmonize shrimp closed seasons to 6 months annually however this has met with limited success.

Although fisheries are insignificant from an economic point of view in Bahrain, they are often seen as being of heritage value since the early economy (pre-1960) very much depended on fishing and trading activities (12). The present study pointed out that most commercial fisheries resources are heavily over-exploited. The impacts of all these challenges significantly affected the fisheries resources under inactive legislations, regulations, and laws those enacted to maintain these vital food resources, which represents livelihood for considerable part of the population in Bahrain and at the same time attracts a large number of expats.

The General Directorate for the Protection of Marine Resources in the Kingdom of Bahrain is responsible for the management and development and the protection of this sector. However this directorate has extremely limited resources. As a result a priority need to be directed for cooperation with fisheries specialists and environmentalists at universities to initiate scientific/technical action plan on fish stock assessment studies, environmental monitoring and socio-economic surveys to support the fisheries management.

Bahrain's territorial waters is characterized by small area, thus a significant number of fish species found more generally in the Arabian Gulf waters utilize Bahrain's territorial waters on a seasonal basis, often for spawning, although some major species are found in the area throughout the year. Bahrain therefore shares many of its fish stocks with other countries of the region (12). However, the regional co-operation is weak or virtually non-existent, both on a bilateral basis and through mechanisms such as the regional fisheries commission, RECOFI. Hence there are no regulations regarding management of shared stocks.

Much research needs to be undertaken to develop evaluation strategies for fisheries management that are based on integrated assessments, which need to be devoted mostly to reduce substantially the current operational fishing capacity if the management goals of resource conservation and stock enhancement are to be achieved. The management needs to be based on a long term strategic action plan to monitor, assess, manage and regulate the commercial fisheries.

Acknowledgements

We would like to express our appreciation to General Directorate for Protection of Marine Resources in the Kingdom of Bahrain and staff at Stock Assessment Department for providing the raw data used in this paper.

References

1- Abdulqader, E.A.A. and Naylor, E. (1995). Bionomics and migration pattern of the green tiger prawn, *Penaeus semisulcatus* De Haan, in Bahrain waters. Fisheries Research, 21:395-407.

2- Al-Ansari, A.; Al-Bosta A.A.; Al-Shaikh, A.H. and Al-Shawoosh, A.A. (1998). Production of sobaity bream, *Sparidentex hasta*, larvae and fry at the National Mariculture Center (NaMaC), Bahrain: 1998. National Mariculture Center, Directorate of Fisheries, Ministry of Works and Agriculture, State of Bahrain, 25 pp.

3- Al-Ansari, A.A.; Shams A.J.; Al-Bosta, A.A.; Al-Shaikh, A.H. and Al-Shawoosh , A.A. (1999). Fry production of sobaity bream, Sparidentex hasta, at Bahrain's National Mariculture Center during the 1999 hatchery season. National Mariculture

Center, Directorate of Fisheries, Ministry of Works and Agriculture, State of Bahrain, 19 pp.

4- Al-Baharna, W. (1986). Fishes of Bahrain. Directorate of Fisheries, Ministry of Commerce and Agriculture, Bahrain. 1st edition, 294 pp.

5- Ali, T. S. (2002). Effects of shrimp trawlers on the fisheries status and environment of the Northwest Arabian Gulf. Acta Ichthyol. Et Piscatoria, 31(2): 77-86.

6- Al-Qaseer, J.A.; Uwate, K.R.; Radhi, A.K. and Al-Baharna, W. (2002). World Food Summit Follow-Up Draft Strategy for National Fisheries and Marine Resource Development Horizon 2010. Directorate of Fisheries and Marine Resources, Ministry of Works and Agriculture, State of Bahrain, 19 pp.

7- Al-Zaidan, A.S.Y.; Al-Mohanna, S.Y. and George, P. (2013). Status of Kuwait's fishery resources: Assessment and perspective. Marine Policy, Vol. 38: 1-7.

8- FAO (2012). World review of fisheries and aquaculture, FAO, Rome, 148 pp.

9- Feidi, I.H. (1997). Fisheries Development in the Arab World. Middle Eastern Natural Environments, Food and Agriculture Organization of the United Nations (FAO) Rome, Italy.

10- Hill, A. and Wolvaardt, C. (2007). The destruction of global fisheries and the emerging dominance of aquaculture. State One Stockbroking Ltd, 26 pp.

11- Mansoor, H.M.; Uwate K.R.; Al-Shaikh, A.H. and Omran, R.H. (2000). Sobaity bream, *Sparidentex hasta*, Fish releases in Bahrain in 1999. National Mariculture Center, Directorate of Fisheries, Ministry of Works and Agriculture, State of Bahrain, 6 pp.

12- Morgan, G. (2004). Country review: Bahrain. Review of the state of world marine capture fisheries management: Indian Ocean. Fisheries and Aquaculture Department, FAO.

13- Radhi, A.K. and Al-Baharna, W. (2000). Fishery situation in Bahrain. Directorate of Fisheries and Marine Resources, Ministry of Works and Agriculture, State of Bahrain, 12 pp.

14- Radhi, A.K.; Al-Safar, N.; Merza, F.; Radhi, A.K.; Abdulla, A.; Ahmed, S.S. and Hermis, N. (2006). Fisheries resources in the Kingdom of Bahrain. Annual Fishery Statistics Report No. 93, General Directorate for the Protection of Marine Resources, Kingdom of Bahrain, 96 pp.

15- Radhi, A.K.; Al-Safar, N.; Hermis, N.; Abdulla, A.; Ahmed, S.S. and Mohsin, J. (2011). Fisheries resources in the Kingdom of Bahrain. Annual Fishery Statistics Report No. 95, General Directorate for the Protection of Marine Resources, Kingdom of Bahrain, 82 pp.

16- State One Stock broking Ltd. (2007). The destruction of global fisheries and the emerging dominance of aquaculture, 26 pp.

17- Uwate, K.R. (2000a). Fishery country profile of Bahrain. FAO, 6 pp.

18- Uwate, K.R. (2000b). Information on Fisheries in Bahrain for the FAO Digital Atlas. FAO, 10 pp.

حالة مصايد الأسماك التجارية في مملكة البحرين

ثامر سالم علي وأسماء علي أباحسين

برنامج العلوم البيئية والموارد الطبيعية، كلية الدراسات العليا، جامعة الخليج العربي، مملكة البحرين

الخلاصة. تناولت الدراسة الحالية المعدلات السنوية لمصيد الأسماك التجارية في مملكة البحرين خلال السنوات 2004 – 2009 بناءاً على بيانات الإحصائيات السمكية للإدارة العامة لحماية الموارد البحرية. تقسم مناطق الصيد في البحرين الى ثلاثة مناطق، الشمالية والشرقية والغربية. تسهم منطقة الصيد الشمالية بالجزء الأكبر من انتاجية مصايد الأسماك بما نسبته 51.3%، وتليها المنطقة الشرقية (38.7%) والأقل إسهاماً هي المنطقة الغربية (10%). شكلت الأسماك الزعنفية ما نسبته 59.4% من المصيد الكلي للمنطقة اشمالية خلال السنوات 2004 – 2009 تلاها مصيد الروبيان (17.1%) ومن ثم مصيد السرطان البحري بنسبة 12.2%. وفيما يتعلق بالمنطقة الشرقية فقد أظهرت النتائج أن مصيد السرطان البحري كان يشكل الجزء الأكبر بنسبة 44.6% وتبعه مصيد الأسماك الزعنفية (34.4%) ومن ثم مصيد الروبيان (15.0%). وبالنسبة للمنطقة الغربية، فإن النتائج بينت بوضوح أن الأسماك الزعنفية كان لها النصيب الأكبر بنسبة 60.8% تبعها مصيد السرطان البحري (29.1%) بينما شكل مصيد الروبيان 5.6%. تم البحث في معدلات الصيد السنوي لستة أنواع من الأسماك الزعنفية تعد من أهم الأنواع التجارية شملت أسماك الصافي *Siganus canaliculatus*، الهامور *Epinephelus coioides*، الشعري *Lethrinus nebulosus*، الكنعد *Scombermorous commerson*، الفسكر *Acanthopagrus bifaciatus* والجنم *Plectorhinchus sordidus* بالإضافة الى الروبيان *Penaeus semisulcatus* والسرطان البحري *Portunus pelagicus* في كل منطقة من مناطق الصيد الثلاثة ومعلات الأسعار لكل منها. وبشكل عام أظهرت النتائج أن هناك منحى تناقص في مصايد الأسماك التجارية خلال السنوات التي شملتها الدراسة تزامن مع ارتفاع ملحوظ في معلات الأسعار. ونتيجة لتدهور حالة المخزون السمكي جراء الصيد الجائر وزيادة النمو السكاني بمعدل 7% تقريباً خلال السنوات 2000 – 2010، فإن حصة الفرد من استهلاك الأسماك قد إنخفضت بشكل جوهري الى أقل من 10 كغم / سنة في عام 2009 مقارنة مع ما يقرب من 25 كغم / سنة خلال الثمانينات. ولأجل تحقيق أهداف إدارة مصايد الأسماك في الحفاظ على الموارد السمكية وتعزيز المخزون السمكي فإن ذلك يتطلب خفضجدير بالإعتبار لجهد الصيد الحالي. وإن إدارة المصايد بحاجة الى أن تعد وفق خطة استراتيجية طويلة الأمد لمراقبة وتقييم وإدارة وتنظيم مصايد السماك التجارية في مملكة البحرين.

كلمات دالة: أسماك زعنفية، روبيان، سرطان بحري، حصة الفرد من الأسماك، البحرين.