

Research Article

Sustainable Management of Marine and Fisheries in Realizing National Food Security: Islamic Perspective

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ABSTRACT

Indonesia is a country which has huge potential resources; including marine and fisheries. The potential of marine and fisheries have not been utilized yet optimally to achieve national food security, therefore there is a need to change the paradigm in its management. In Islamic perspective, the paradigm changing includes in managerial view to realize that the sea is public property and the country as a representative of the people has a responsibility to provide intelligent and sufficient human resources in those fields fairly. The country is also responsible in providing a reliable and adequate technology, favorable market climate and sustainable marine resources.

1. INTRODUCTION

Prophet Muhammad (peace be upon him) said: **"The Son of Adam has no better right than that he would have a house wherein he may live, a piece of clothing whereby he may hide his nakedness and a piece of bread and some water" [Tirmidzi].**

Food is a basic need and right of every human being. The world's food needs are increasing together with the increase of population in the world. In 1930, the world population was only 2 billion and 30 years later, in 1960, reached 3 billion. The surge in world population reached a high increase over 1960. It can be seen from the total population in the 2000s that reached approximately 6 billion people. This population growth will lead to various problems including the food scarcity. World Food Summit (1996), defined food security as "all people, at all times, have physical and economic access of food which is sufficient, safe and nutritious to fulfill their dietary needs and food preferences for an active and healthy life". In Indonesia, food problems cannot be avoided, although Indonesia is often referred to as an agricultural country that most people are farmed. There are still many areas in Indonesia which suffer on food shortages.

Marine and fisheries provide workers around 170 million people in the whole world and they also contribute to food security. Fish and fishery products are the most widely traded agricultural commodities; export worth is USD 86 million in 2006 (FAO, 2009). Fisheries are particularly important for developing countries, contributing to the livelihoods of many poor rural and coastal communities, as well as providing export revenues that are greater compared to other agricultural commodities.

Dahuri (2011) stated that there are at least eleven marine economic sectors which can be developed to realize the independence of the nation, namely: (1) fisheries, (2) aquaculture, (3) fish processing industry, (4) marine biotechnology industry, (5) oil resources energy, (6) marine tourism, (7) sea transportation, (8) the resources of small islands region, (9) salt, (10) industry and maritime service, and (11) non-conventional resources. The economic total potential of the eleventh of maritime sector reach USD 800 billion per year. Therefore, this sector should receive more attention.

Poorly performing toward marine and fisheries will give risk at these potential benefits and threaten livelihoods of people who depend on them. Rising food prices and the need to fulfill food security about 9.6 billion people in 2050, fisheries contribution need to be maintained and increased. Therefore, effective management is required to maintain these benefits as well as to ensure greater resilience in natural ecosystems to withstand potential of climate change.

2. MATERIALS AND METHODS

Either Islamic or sharia rules how natural resources, including marine and fisheries has to be managed to reach public prosperity and balancing economic, ecological and social aspects. These rules were scattered in many fiqh books written by muslim scholars in the past and this century. One can declare an opinion as Islamic views/argument if it is built using valid methodology (ushul fiqh) and based on the sources of Islamic rules (dalil), such as Holy Quran, the Sunnah of the Prophet Muhammad, consensus (ijma') of the companions (sahabah) of the Prophet Muhammad and Islamic analogy or qiyas (Abdullah, 2002; Hilal, 2004; Ismail, 2011 in Wibowo, 2013). Therefore, our approach in informing this paper, we were not only used a number of scientific articles published sources, both paper and electronics, which have related to fisheries, marine and food fields, but we also used Holy Quran and Sunnah of the Prophet Muhammad.

3. RESULTS AND DISCUSSIONS

3.1. Food Security

3.1.1. Definition of Food Security

There is no universally accepted definition of food security. Food security means different things for different human beings and societies, and is understood differently by institutions, experts and scientists. Some authors make a distinction between absolute and relative food security: absolute food security meaning food production within a single country, equivalent to or greater than domestic demand, and relative food security meaning the ability of a State or group of countries to provide goods and foodstuffs in whole or in part (Baz, 2008). Food security is defined as the state in which food (sustenance) is available to all members of society, in reasonable quantities allowing enough sustenance and natural growth, and of a safe/acceptable quality that will not cause diseases or toxicity, all year round and at an affordable price/cost (Haddad, 2012).

According to the regulation No.7 of 1996, food security is the condition of the fulfillment of food for each household, which is reflected in the availability of sufficient food in quantity and quality, safe, equitable and affordable. The food consists of crop commodity, livestock and fisheries; everything that comes from biological resources and water, treated or untreated, which is supplied as a food or drink for human consumption, including food additives, food raw materials, and other materials used in the preparation processing, processing or manufacturing of food or drink. Quality of food is the value determined on the basis of food safety, nutritional content, and trading standard criteria to food stuff, food and beverage.

Meanwhile, according to Haryadi (2011), aspects of food security involve three things: (1) Availability of food, including: the adequacy of the amount, quality, nutrition and safety, (2) Affordability, including: physical accessibility, economic and social, conformity with the reference, customs and cultural appropriateness and suitability with confidence, (3) Consumption adequacy, including: of intake, food processing quality, the quality of sanitation and hygiene, water quality and quality of child care.

3.1.2. Problems of Food in Indonesia

Food security is a system consisting of subsystems of availability, distribution, and consumption. Food availability subsystem functions as guarantee of food supply to fulfill the needs of the entire population in terms of quantity, quality, diversity and safety. The distribution subsystem serves to create an effective and efficient distribution to ensure that all households can obtain food in sufficient quantity and quality over time at an affordable price. While the consumption sub system serves to direct in order to national food utilization pattern meet the rules of quality, diversity, nutrient content, security and halal.

According to Jaya (2009), some food problems in Indonesia are as follows:

- (1) Inconsistency and food security policy synergy between central and local levels.
- (2) Appropriate and reliable food security program for achieving the Millennium Development Goals (MDGs).
- (3) Development of technology, human resources and institutions for food security.
- (4) The production and low food productivity.
- (5) Efficiency of distribution, trading and marketing of food products across time and regions.
- (6) The low purchasing power of food interrelated with high poverty and unemployment.
- (7) Low consumption of food
- (8) The food nutritional quality of the population, especially for the poor and vulnerable groups.
- (9) Food safety, particularly the use of hazardous materials.
- (10) Knowledge and behavior of inadequate food diversity.

Meanwhile, according to Sucipto (2012), the fulfillment of people's food is not a simple matter. Moreover, the food becomes the object of speculation and liberalization. Discourses of food security and food sovereignty concept to fulfill the food are still used. Food is also related to the availability, accessibility, acceptability, and symbol of people's welfare.

Exemption of import duty was decided by the government during one year to 57 tariff lines such as rice, grain, soybeans, fertilizer raw materials and animal feed in 2011 encourage food imports. The food imports are milk 90%, sugar 30%, salt 50%, 100% grain, 70% soybean and 30% beef. In fact, except for grain, all the food can be produced domestically.

Related to the food crisis, there are three possibilities of the cause of the food crisis. First, the production is less than that of consumption. Second, production is more than that of consumption. Physically, it is not distributed well to consumers because of the lack of the infrastructure support, although consumer purchasing power reaches out. Third, production is more than that of consumption and physically it can be distributed to consumers, but the price is not affordable for consumers.

3.2. Marine and Fisheries

3.2.1. The State of Global Fisheries

World's capture Fisheries and Aquaculture provide approximately 148 million tons of fish in 2010 (with a total value of USD 217.5 billion) and about 128 million tons are used as food for humans. Data 2011 indicated that there has been an increase in production up to 154 million tons, 130.8 million tons are used as food for humans (Table 1 and Fig. 1).

Table 1. Production and utilization of capture fisheries and aquaculture in the world

	2006	2007	2008	2009	2010	2011
(Million tonnes)						
PRODUCTION						
Capture						
Inland	9.8	10.0	10.2	10.4	11.2	11.5
Marine	80.2	80.4	79.5	79.2	77.4	78.9
Total capture	90.0	90.3	89.7	89.6	88.6	90.4
Aquaculture						
Inland	31.3	33.4	36.0	38.1	41.7	44.3
Marine	16.0	16.6	16.9	17.6	18.1	19.3
Total aquaculture	47.3	49.9	52.9	55.7	59.9	63.6
TOTAL WORLD FISHERIES	137.3	140.2	142.6	145.3	148.5	154.0
UTILIZATION						
Human consumption	114.3	117.3	119.7	123.6	128.3	130.8
Non-food uses	23.0	23.0	22.9	21.8	20.2	23.2
Population (billions)	6.6	6.7	6.7	6.8	6.9	7.0
Per capita food fish supply (kg)	17.4	17.6	17.8	18.1	18.6	18.8

Source: FAO (2012)

The increase in production of fisheries capture has been largely due to the world’s fishing fleet expanded steadily since the end of the First World War, when countries supported the development of their national fishing fleet in the interests of food security and national defense. Since 2006 when 2.1 million world’s fishing vessels were motorized, most of the vessels are small-scale vessels and 70% of them in Asia. From amount the vessels, 1.3 million operated in enclosed areas and 23 thousand were industrial vessels having a capacity 100GT (almost more than 24 meters in length).

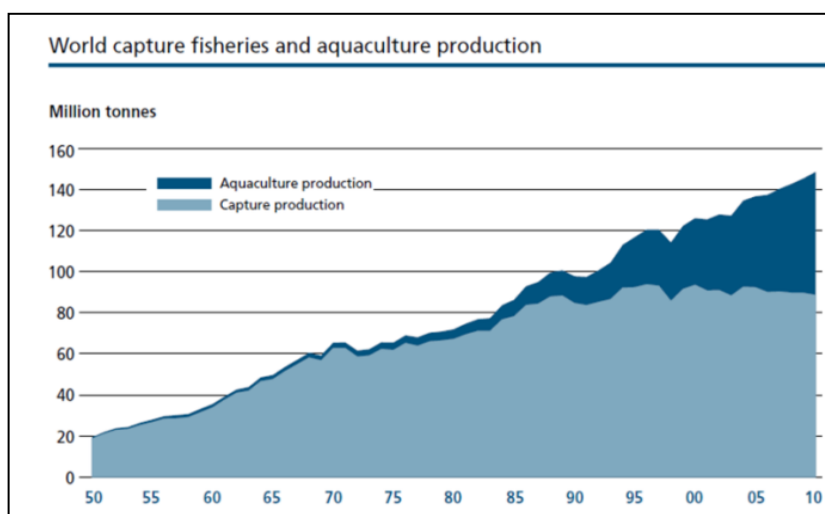


Figure 1. World capture fisheries and aquaculture production (FAO, 2012)

Although the number of vessels has fallen slightly since the 1990s, the power and catching capability of the world vessels continues to rise. This is due to more powerful engines, inventions in technology such as fish-finders, and more efficient fishing gears. These factors mean the global fishing vessel fleet can catch fish further and deeper than ever before. Illegal, unreported and unregulated fishing (IUU), are estimated to catch 11–26 million tons of fish worth USD 10–20 million annually (Agnew et al. 2009), which puts pressure on fish resources and undermines management effort.

3.2.2. Marine and Fisheries of Indonesia

Indonesia is an archipelago country where about 75% of the area is sea with more than 17,500 islands and 95,181 km long coastline, rank number 4th in the world (World Resources Institute, 2001). This condition is also supported by the number of fishermen in Indonesia who reach more than 2 million (KKP, 2011). In addition, Indonesia is also located in a tropical climate region, where there are multispecies of renewable resource. National fisheries production in 2011 reached 13.64 million tons and calculations in 2005 showed fisheries sector has 14.02% of the workforce. Marine sector also has great wealth in state income, sea tourism, marine service and the other potentials.

Indonesia is the 3rd largest capture fisheries country in the world after China and Peru (Fig. 2).

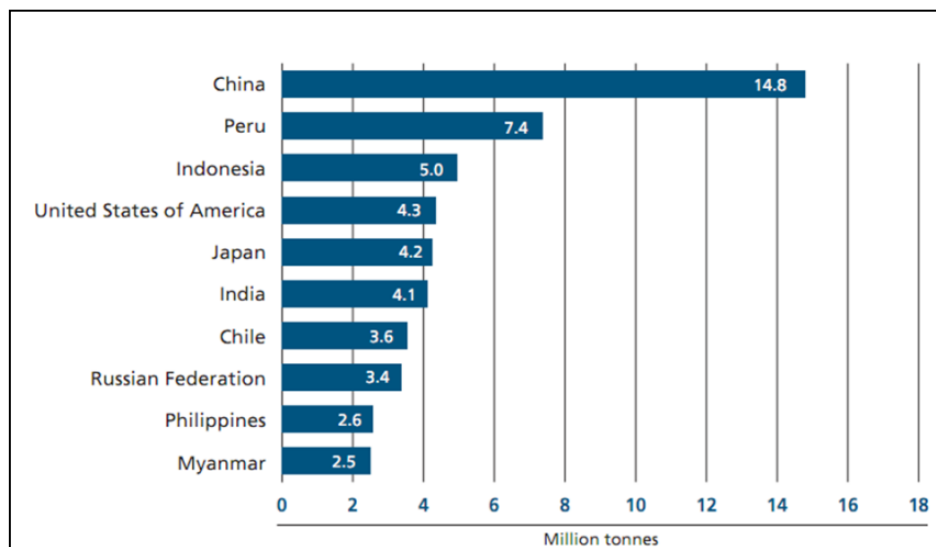


Figure 2. Ten largest producing countries of fisheries capture in the world (FAO, 2010).

As an archipelagic country, Indonesia has tremendous potential in the marine and fisheries field. Sea in Indonesia is the largest Marine Mega Biodiversity in the world consisting of 8500 species of fish, 555 species of seaweed, 950 species of coral reef with potential is 85000 km² and the potential of 24528178 ha of cultivated area. Fish resource consists of pelagic fish, demersal fish, reef fish, shrimp, lobster and squid. The total potential for sustainable 6.5 million tons/year, capture fisheries production in 2011 is 5.34 million tons/year, the utilization rate of 82.15% (KKP, 2011). While the potential level, production and utilization of fish resources according to Dahuri (2002) can be seen in Table 2. An overview of the extensive water and the length of Indonesian coastlines can be seen in Table 3.

Table 2. Potential, production and utilization rate of fish resources in Indonesia

Resource group	Potential (10 ³ tones/year)	Production (10 ³ tones/year)	Utilization (%)
Large Pelagic Fish	1.165,36	736,17	63,17
Small Pelagic Fish	3.605,55	1.784,33	49,49
Demersal Fish	1.365,08	1.085,50	79,52
Reef Fish Consumption	145,25	156,89	>100

Source: Dahuri (2002)

The extent of water illustrates the extent of "land" for the capture fisheries, while the length of the coastline illustrates marine cultivation area. However, the level of exploitation of fish resources in every region of the Indonesian fisheries management is different. An example of overfished area is the Java Sea. The other regions such as in the Banda Sea or the Indian Ocean (West Sumatera and Southern Java), where "underexploited" or "moderate" are located in a relatively far coastline, difficult to reach and large bumpy. Therefore those regions are only enjoyed by fishermen having high technology.

Table 3. The extensive water and the length of Indonesian coastlines

The extensive water	Distance
extensive Indonesian Sea	5.8 million km ²
extensive archipelagic waters	2.3 million km ²
extensive Territorial Waters	0.8 million km ²
extensive water of EEZ Indonesia	2.7 million km ²
length of Indonesian coastlines	99.093 km

In addition, the imbalance between the Indonesian resource utilization among Regional Fisheries Management Area (Wilayah Pengelolaan Perikanan/WPP) and national catching fisheries fleet is still dominated by small-scale fleet. The support of fishing port infrastructure has not optimally provided in term of quantity, completeness of the facilities and the supporting of financial institutions and fishermen access.

Based on assessment commission of fish stocks through Decree of the Minister KP no.45/Men/2011, many areas have overfished and fully exploited (Table 4).

Table 4. Resource utilization status of fish in 11 WPP according to the Assessment Commission of Fish Stock

WPP Code	Regional Fisheries Management (WPP)	Demersal	Shrimp	Small Pelagic	Big Pelagic
571	Malaka Strait	Fully exploited	Over fishing	Fully exploited	Uncertain
711	South China Sea	Fully exploited	Over fishing	Over fishing	Uncertain
712	Java Sea	Fully exploited	Over fishing	Over fishing	Uncertain
713	Flores Sea dan Makasar Strait	Over fishing	Over fishing	Over fishing	Uncertain
714	Banda Sea	Fully exploited	Uncertain	Fully exploited	Moderate
718	Arafura Sea	Over fishing	Fully exploited	Moderate	Uncertain
715	Tomini Bay, Halmahera Sea, Maluku Sea, Seram Sea dan Berau Bay	Moderate	Over fishing	Fully exploited	Fully exploited
716	Sulawesi Sea and North Halmahera Island	Moderate	Over fishing	Moderate	Fully exploited
717	Cenderawasih Bay dan Pasific Ocean	Moderate	Over fishing	Moderate	Over fishing/ Moderate
572	Hindia Ocean A (West Sumatra and The Sunda Strait)	Fully exploited	Over fishing	Over fishing	Fully exploited/Moderate
573	Hindia Ocean B (South of Java - West Timor Sea)	Moderate	Over fishing	Fully exploited	Fully exploited/Moderate

On the other hand, the majority of people who live in coastal areas are always marginalized and poor. This is caused not only by environmentally unfriendly catching that disrupt ecosystem sustainability and destroy the habitat of fish in the sea, but also by illegal fishing by foreign vessels in Indonesian WPP (Fig. 3). Foreign vessels usually are equipped with sophisticated tools such as fish finders and satellite to determine potential ground and great capacity of fishing equipment and machine, so it can go faster and reach wider areas. All of these capabilities have not been owned by Indonesian fishing vessels.



Figure 3. Origin of Illegal Fishing Vessels in Indonesian-WPP

3.2.3. The Factors Causing the Illegal Fishing

The factors causing the illegal fishing in the waters of Indonesia cannot be separated from the global strategic environment, especially the condition of fisheries in other countries that have maritime border, and the fisheries management system in Indonesia itself. In outlines, the causes can be categorized into six factors, as described below.

1. The world’s fish demand increases, on the other hand the world’s fish supply decreases. Over demand occurs mainly on marine fish species such as Tuna. These conditions encourage the world fishing fleet to hunt the fish everywhere legally or illegally.
2. Price disparity of whole fresh fish between other country and Indonesia is still high enough to make a surplus of income.
3. Fishing ground in other countries has started to run out, while in Indonesia is still promising. Moreover, they have to maintain their supply of fish for consumption and maintain production processing in the country to survive.
4. Indonesian sea is very wide and open access. Surveillance capabilities, especially national surveillance fleet are still very limited compared to the need to safeguard vulnerable areas.
5. Limited facilities and infrastructure monitoring and the amount of human resources of fishery.

6. Perceptions and actions of law enforcement cooperation are still weak, especially in terms of understanding the legal action, and commitment surveillance vessels operating in the Exclusive Economic Zone (EEZ).

Illegal fishing activities in the WPP-RI area have led to great loss for Indonesia. Overfishing, overcapacity, the threat to the sustainability of fish resources, bad fishery effort condition, lack of enterprise competitiveness and the neglect of fisherman are the real impact of illegal, unregulated and unreported (IUU) fishing. Another detriment that could not be assessed in the material but related to national dignity is a bad image of Indonesia in international view regard to improper management. With all this condition, it would be required a fisheries management which is based on a slightly different perspective such as Islamic perspective.

3.3. The Islamic Perspective in Marine and Fisheries Management

Allah Subhanahuwata'ala has said in holy Quran, **"This day, I have perfected your religion for you, completed My Favour upon you, and have chosen for you Islam as your religion"** [QT. Al-Maidah (5):3].

Islamic believes are directions of a variety of implications for everyday lives, covering individual aspects such as worship and morality, as well as public sectors including social, economic, and political issues. One of the public issues which are addressed by Islam is natural resource management, including marine and fisheries. Allah Subhanahuwata'ala has said in holy Quran, **"And He it is Who subjected the sea (to you), that you eat there of fresh tender meat (i.e. fish), and that you bring forth out of it ornaments to wear. And you see the ships ploughing through it, that you may seek (thus) of His Bounty (by transporting the goods from place to place) and that you may be grateful"** [QT. An-Nahl (16):14]. In other surah, Allah Subhanahuwata'ala also said, **"And the two seas (kind of water) are not alike: this is palatable, sweet and pleasant to drink, and that is salt and bitter. And from them both you eat fresh tender meat (fish), and derive the ornaments that you wear. And you see the ships cleaving (the sea-water as they sail through it), that you may seek of His Bounty, and that you may give thanks"** [QT. Al-Fatir (35):12].

The following things that might be a basic of marine and fisheries management for supporting food security are:

1. Marine resources are the common property

Regarding natural resources, Rasulullah Sallallahu 'alayhiwasallam has said, **"The muslims are partners in three substances, water, pastures and fired"** [Sunan Abu Dawud].

Based on chapter 33 verse (2) and (3) of the 1945 Indonesian constitution, actually natural resources which are used for the lives of many people cannot be owned by individuals, and should have been controlled by the state for the prosperity of the people. The sea has many functions, as a highway, as a habitat for aquatic creatures, as well as a source of energy and minerals. Therefore the sea should be recognized as common property.

Because the sea is common property, then it may not be dominated and controlled by high technology people. Unlike this time, people who have trawl, coupled with sonar and GPS technology to seek fish, added with a floating fish processing factory, can dredge the fish as much as possible, so that practically ordinary fishermen get nothing. Therefore, the state must manage for healthy competition, for example, high-tech fishing should only be operated in a fishing area that fishermen could not reach it. But, this kind of the concession system should be still controlled closely in order to the system do not damage the overall ecosystem and harm the people as the true owner of the sea area.

2. Availability of sufficient and intelligent human resources in marine and fisheries field

State empowers low class fishermen through free or cheaper education, subsidize upgrading technology and also provide a no-interest loan capital so they can increase productivity. These empowerments keep thinking over the sustainability of marine resources, so overfishing can be avoided. When there are too many capturing fishermen in a region, then the state must make conversion efforts toward them so they become cultivation fishermen or alter to the post-harvest industry.

3. Availability of reliable and adequate marine and fisheries technologies

The dominance of foreign vessels which have high-tech must be removed through state efforts to encourage the acquisition and transfer of marine and fisheries technology, so there are no longer dictated by foreign corporations. There are so many technologies involved, which require hard work of researchers and engineers. These technologies include ship design, navigation tools, electronics telecommunication, satellite, sonar, trawling nets, and floating fish processing factories. Those people who succeed in making a breakthrough technology should be rewarded properly for not selling the technology to the foreigners, who then apply the rules of right of intellectual property that will be harmful themselves.

4. The state provides conducive market

The unfavorable market is characterized by the asymmetry of seller power (i.e. fishermen) and buyer (i.e. middlemen). Sellers can be very weak when catching fish products are threatened foul if not sold out, meanwhile capital credit used for fishing keep going and bearing interest over time. In contrast, buyers can be very weak when the seller is a few. There are only high-tech fishermen because many small-capital fishermen lose in selling competition.

The state needs to create a buffer agency like logistic agency (badan urusan logistik/BULOG) for fishery products, in order to when the price goes down, the state buys it with a reasonable price which is higher than the market price, and at high prices, the state again to take it off the market at a price lower than the fair market price. A state may only be a monopoly or monopsony for not taking a profit, but merely to take care of the peoples' affairs.

5. The state preserves sustainable marine resources

Allah Subhanahuwata'ala has said in holy Quran **"Evil (sin and disobedience to Allah) has appeared on land and sea because of what the hands of men have earned (by oppression and evil deeds), that He (Allah) may make them taste a apart of that which they have done, in order that they may return (by repenting to Allah, and begging His Pardon)"** [QT. Ar-Ruum (30):41]

At the same time, for areas that need a highly capital-intensive technology, the state through hits state-owned enterprises can take over the marine resources to fully provide revenue for the country to be given to the people. The state does not give this optimization to the market, because the market tends to only think about the profits for itself. There is no market economy that succeeds in optimizing itself in an environment matter. In order to remain sustainable marine areas, the state should also keep the uncontaminated sea, either by wastes or accident at sea by fishing operations that use hazardous materials (such as blast fishing) as well as contamination material derived from land.

Therefore, the state must ensure that no pollution and illegal-fishing, either from foreign vessels that enter the sea without permission or from licensed ships but operate outside the specified area. The armed forces must be strengthened to be able to keep the border and detect the position of each licensed vessel and check quickly in the database, whether they operate in the specified area or not. The state must pro-actively deal with foreigners-corporation doing illegal fishing, pollution or breach area of operation, instead of the small fisherman, or Non-Governmental Organization (NGO).

In addition, for every foreign person included in foreign fishing companies which catch fish in Islamic state seas, it is considered void his agreements and his security guarantees. For this case, according to Ibn Qudamah, submitted to the Caliphate. Caliphate could choose one of four actions: (1) sentenced to death (al-qatl); (2) cite as slaves (al-istirqaq); (3) used as ransom (al-fida'); and (4) removable (al-mann) as the appropriate enemy was used prisoners of war (Qudamah Ibn al-Mughni, p. 2353) (Abdurrahman, 2012).

Marine-based food

Some of the steps to develop a marine-based food (Gumilang, 2013) are:

1. At the macro level, the government needs to change the paradigm of food sources from mainland orientation to the ocean as an alternative food resource. Gradually, the marine food biotechnology industry needs to be built in every coastal region which has abundant fishery production potential such as in eastern Indonesia. In this case, the availability of adequate infrastructure, fisheries logistics, human resource skills, safe investment and analysis export domestic market potential are needed.
2. Stop the import of whole foods that can be produced domestically. It requires courage, assertiveness and correctly food political vision of government.
3. The maritime sectors become a source of national economic strength. National development is conducted in coastal areas. Economic, social, and cultural problems of coastal communities must be considered. The development of infrastructures in coastal areas needs to be addressed to be better.
4. Increasing budgets and sea food research. The existence of a research in the marine food field will increase innovation and competitiveness. Identification of marine food commodities in each district/coastal town is needed to be developed as an industrial competence in a certain area.
5. The role of government in the protection and welfare of fishermen as food entrepreneurs. Handling of fishing result by fishermen is needed to be addressed to improve the quality and the price is not monopolized by middlemen.

With all these efforts, food of the marine sector can be applied in the field. Various sociological and cultural constraints of coastal communities need to be solved. Cooperation among fishery stakeholders in developing a marine-based food is needed. Food resources from the sea will contribute greatly to the national food security support.

4. CONCLUSION

Indonesia is a country with huge potential of natural resources that two of them are marine and fisheries. However, these natural resources have not been able to be managed properly to achieve national food security. A good and sustainable management is needed in marine and fisheries field in order to utilize optimally and sustainable. Islamic perspective can be used as a rationale to make proper and sustainable management. The management is expected to improve the welfare of the whole society, especially the fishermen.

References

- Abdurrahman, H. (2012). Policy of caliphate against foreigners crime. Retrieved from http://hizbut-tahrir.or.id/2012/06/10/kebijakan_khilafah_terhadap_kejahatan_warga_asing.
- Ambari, L.W. (2013). The sharia practice for establishing sustainable mining industry. *Proceeding of Sharia Economics Conference- Hannover*. 145-153
- Agnew D.J., J. Pearce, G. Pramod, T. Peatman, R. Watson, J.R. Beddington & T.J. Pitcher. (2009). *Estimating the worldwide extent of illegal fishing*. PLoS ONE, 4(2).
- Baz, S. (2008). *The Concept of Food Security*. Retrieved from: <http://www.uaeec.com>
- [BRKP] and [LIPI]. (2001). *Fish stock assessment in Indonesian waters*. Cooperation PRPT-BRKP-DKP and PPO-LIPI, Jakarta. 125 p.
- Dahuri, R. (2011). Marine biotechnology industry as Indonesia's new economic growth engine. *Economic Neraca Daily*, November 18, 2011.
- Dahuri, R. (2002). *Rebuilding the Indonesian economy through fisheries and marine sectors*. Institute of information and development studies Indonesia. Jakarta
- FAO. (2012). *The state of world fisheries and aquaculture*. Food and agriculture organization of the United Nations. Rome, Italy. Retrieved from <http://www.fao.org/>
- FAO. (2010). *Code of conduct for responsible fisheries*. Food and agriculture organization of the United Nations. Rome, Italy. Retrieved from <http://www.fao.org/>
- FAO. (2009). *The state of world fisheries and aquaculture*. Food and agriculture organization of the United Nations. Rome, Italy. Retrieved from <http://www.fao.org/>
- Gumilang, A.P. (2013) Food Security-Based Marine. *Bisnis Indonesia Daily*. November 22, 2013
- Haddad, M. (2012). An Islamic perspective on food security management. *Water Policy Journal* 14, 121–135. An-Najah National University, Nablus, Palestine.
- Hariyadi, P. (2011). National food security challenge. *Paper in seminar and socialization program research Nugraha Indofood 2011*. UGM-Yogyakarta
- Jaya, I. (2009). Opportunities, challenges and research agenda for food security in fisheries sector. *Paper in fisheries management seminar in Islamic perspective*. FPIK-IPB
- [KKP]. (2011). *Marine and fisheries statistics 2011*. Jakarta

- Khomsan, A. (2003). *Food and Nutrition for Health*. Jakarta
- MRAG. (2010). *Towards sustainable fisheries management: international examples of innovation*. MRAG Ltd., London: 93 pages.
- Muhammad T.H., and M.M. Khan. (1434H). *The noble qur'an: english translation of the meaning and commentary*. King fahd glorious qur'an, Madinah munawwarah, K.S.A. Print
- Sucipto. (2012). *Parse problems fulfillment food people*. IPB
- Wibowo, A. (2013). Islamic views on main debated-forest policies under new order government in Indonesia. *Journal of Islamic Perspective on Science, Technology and Society (JISTECS)* Vol. 1 No. 2, 28-33