



The Performance and Strategy of Indonesian's Fisheries: A Descriptive Review

Abdul Bashir*, Zulkarnain Ishak, Imam Asngari, Mukhlis, Dirta Pratama Atiyatna, Ichsan Hamidi

Department of Development Economics, Faculty of Economics, Universitas Sriwijaya, South Sumatera, Indonesia.

*Email: abd.bashir@unsri.ac.id

Received: 02 October 2018

Accepted: 17 December 2018

DOI: <https://doi.org/10.32479/ijefi.7188>

ABSTRACT

This study to analyze the performance and strategy of fisheries in Indonesia. The data used in this study is secondary data during 2011-2016. Source of data from the Ministry of Maritime Affairs and Fisheries (KKP) and Central Bureau of Statistics (BPS). The analytical method used with a qualitative descriptive approach, in addition also, for strategy mapping through the SWOT analysis approach by evaluation of strengths, weaknesses, opportunities, and threats in the fisheries sector. The findings of this study indicate that during 2011-2016, the growth performance of production, consumption, investment, export value, trade balance, and potential fish resources based on Maximum Sustainable Yield has increased significantly. However, in our observation, there are still many weaknesses and threats that must be resolved. For this reason, we formulated a strategy in an effort to overcome weaknesses and minimize these threats in conclusions.

Keywords: Fisheries, Production, Consumption, Trade, SWOT Analysis

JEL Classifications: Q20, Q22, K24

1. INTRODUCTION

The fisheries product market at the domestic and global level currently demands quality standards, size uniformity, and product innovation. On the other side, most of the current producers of fish are small-scale and also have a variety of products. Even though the industrialization market is currently demanding order uniformity for the product processing fishery. Maritime and fishery development is one of the sectors that receive high attention and priority for the Indonesian government, especially with the establishment of the Ministry of Maritime Affairs and Fisheries (KKP). It is expected that in the future the intensity and penetration of fisheries development will be better in terms of quality and quantity.

In addition, equitable development in the context of realizing more stable and dynamic economic conditions cannot be separated from the role of the main non-food sub-sectors such as fisheries

(Andersen, 2015; Anriquez and Stamoulis, 2007). Fisheries is one of the agricultural sub-sectors after food crops, plantation crops, livestock, and forestry are one of the livelihood options of the Indonesian population. Type of fishery business in Indonesia has high economic value, proven by average value gross domestic product growth of 6.79% during 2011-2017 (Figure 1).

Fish has always been an important source of protein in human food and on a global scale, fish and fish products are the most important protein source and it is estimated that more than 30% of fish for human consumption comes from aquaculture and marine (Håstein et al., 2006). Over the past three decades, fish farming has developed into the largest fish producing sector in Indonesia. Most fish products come from small-scale producers in developing countries. More than 80% of global fish processing products are produced in freshwater (Marschke and Wilkings, 2014; Tidwell and Allan, 2001). From early developments in Asia, fish farming has experienced very large development and is currently very

diverse (Thornton, 2010). According to Abowei and Tawari (2011) Njai (2000), the fisheries sub-sector functions as a source of income and facilitate the development of home industries and provides employment opportunities for many people involved in fisheries production, processing, and marketing. In addition, fish meat also functions as an important protein supplement for meat protein, even more currently of meat price has the continuous increase (Daniel et al., 2011; Weinert, 2009).

The development of Indonesia's fisheries subsector is an effort to develop fisheries business in all potential areas (Halim and Juanri, 2016). Potential fisheries resources consist of freshwater fisheries and seawater fisheries. The potential of freshwater fisheries is still wide open both in wetland, ponds, floating nets, and cages. On the other hand, Indonesia is a country that benefits from having a huge potential of fishery resources both in terms of quantity and diversity. The potential of catch fisheries resources based on maximum sustainable yield (MSY) in Indonesia in 2017 is estimated at 12.54 million tons per year, while the potential that can be utilized (allowable catch) is 80% of MSY which is 10.03 million tons per year. Meanwhile, there has been an imbalance in the level of utilization of fisheries resources between regions and between types of resources (Adisanjaya, 2009). In some regions there have been more catching symptoms (overfishing) such as in the Java sea area and the Malacca Strait, while in most eastern regions the utilization rate is still below the sustainable potential, in other words, it is still not optimal. Java Island and Sumatra are the largest regions producing aquaculture fish in Indonesia.

On the other side, one of the fisheries problems faced by Indonesia, i.e., the rampant illegal, unreported and unregulated (IUU) fishing activities in Indonesia, has caused significant losses, both in terms of economic, social and environmental, so this activity can be stated as a major obstacle for Indonesia in realizing sustainable catch fisheries (Ahmad, 2011). IUU fishing activities are not only carried out by foreign-flagged fishing vessels, but also by national fishing vessels. This is reflected by the low level of compliance of national fishing vessels on the rules of the game in the management of fish resources, such as the non-compliance of national fishing vessels in using vessel monitoring system and reporting of the catch logbook.

Meanwhile, Indonesia is one of the largest fishery producer countries in the world, besides China. However, Indonesia is also

not included in the top five exporters of world fishery products because it has not optimized the existing fisheries potential. On the other side, Indonesia's fisheries production export performance under China and Vietnam, because the ability to increase fisheries value-added is still not optimal. However, Indonesia still has a great opportunity to improve the export performance of fishery products due to a shift in healthy lifestyles that encourage increased consumption of fishery products globally. On the other side, demands for global trade with high levels of competition. For this reason, there needs to be an effort to increase the competitiveness of fishery products by producing a variety of competitive products with good quality and in accordance with food safety standards (Frohberg et al., 2006; Vieira, 2006).

Based on the problems background has described, the objective of this study is to analyze productivity and strategy of fisheries in Indonesia. In the next session, we will explain the analytical methods and SWOT analysis. The third session explained the results and discussion, and the final session will present the conclusions of our study.

2. RESEARCH METHOD

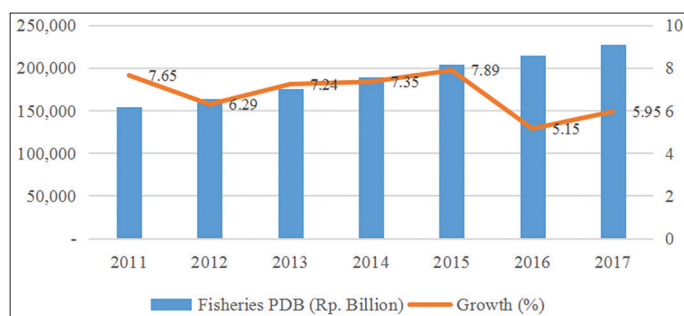
The scope of this study was the descriptive study that performance analyzes such as the productivity of fisheries from side production, consumption, export, import, investment, trade balance, and potential of fish resources (MSY). In addition, this study also to formulation strategy in facing the sustainable development of the fisheries sector in the future through SWOT analysis by mapping strengths, weaknesses, opportunities, and threats in the fisheries sector. The data used in this study is secondary data during 2011-2016. Source of data from the Ministry of Maritime Affairs and Fisheries (KKP) and Central Bureau Statistics (BPS). Meanwhile, other information in this study also obtained from literature reviews such as article and study report. In addition, was also held Focus Group Discussion to obtain opinions from the experts.

3. RESULTS AND DISCUSSION

Based on production and consumption performance, fisheries production in Indonesia currently has a positive trend; in 2016 the total national fishery production amounted to 23.5 million tons consisting of catch fisheries of 6.8 million tons and aquaculture of 16.7 million tons. The total production increased from the previous year by 5.35%. The increased of catches production and aquaculture is highly dependent on weather climate, technology, seeds, fish feed, and the quality of water used by fishermen and fish farmers. The trend of fish production and consumption can be seen in Figure 2.

Meanwhile, annual per capita fish consumption in 2016 reached 46.46 kg per capita per year, the fish consumption increased from the previous year of 6.88%. The increase in fish consumption is inseparable from an increase in the population and an increase in the nutritional needs of the population because fish are a very relevant source of protein to improve the quality of life of the population in Indonesia.

Figure 1: The trend of gross domestic product fisheries growth in Indonesia



Source: BPS, Indonesia Statistics, processed

Figure 3 shows a positive production trend for aquaculture and catch fisheries, which during 2011-2016 aquaculture production grew by an average of 16.6%. While capture fisheries production grows by 3.74% during the same period. Generally, the increase in aquaculture production can be influenced by the fish seeds quality, the fish feed quality, and the water quality. Meanwhile, an increase in catch fisheries production can be influenced by weather and technology used by fishermen.

In terms of trade performance, Indonesian fisheries production exports are still below China and Vietnam. Indonesia is also not included in the top five exporters of world fishery products. Looking ahead, Indonesia still has a great opportunity to increase fisheries product exports due to a shift in healthy lifestyles which encourages increased consumption of fishery products globally. However, given the demands of global trade with high levels of competition, Indonesia needs to improve the competitiveness of its fishery products by producing a variety of competitive products with good quality and in accordance with food safety standards.

Figure 4 shows a fluctuating trend in the value of exports and imports of fishery products, the value of fishery exports on average grew by 3.95% during 2011-2016. While the import value on average grew negatively by -2.96% during the same period. Export performance of fisheries in Indonesia not separated from export growth to destination countries such as the United States averaged grew of 10.94% per year during 2011-2016, Japan average negative grew of 4.19%, ASEAN grew average of 0.47%, China averaged grew 10.25%, and the EU grew by 3.74% during the same period. Meanwhile, Indonesia's import value during the 2011-2016 period, dominated by processed fish products such as Fish-Pellet Flour which average grew negatively of 4.24% per year during 2011-2016, Fish oil fat which average grew negatively of 2.94%, Mackerel which average grew by 10.58% per year, Crab averaged grew negatively of 4.58%, Salmon-Trout grew by average of 46.43%, Sardines grew by average of 15.61%, and other products on average grew by 1.21% during the same period.

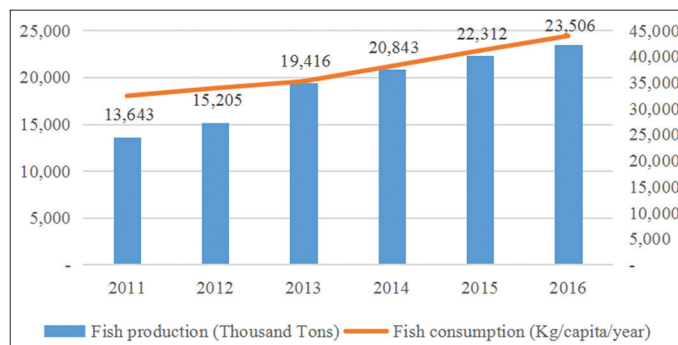
International trade investment in fishery products currently is not only affected by factors of demand and supply but also determined by the results of fisheries international conventions and agreements. The agreement regulates the mechanism of trading fisheries commodities in the international market. To enter the export market several strategic things that need to be considered are: Product commodities, competitiveness, quality and quality of products, tastes and purchasing power of consumers, delivery time, and analysis of the conditions of export destination countries, including population, tradition, socio-political conditions and export-import regulations.

In terms of investment performance, based on data from the Ministry of Maritime Affairs and Fisheries, in 2017, foreign investment of IDR.193 billion, the investment value that increased from the previous year which only reached IDR. 34 billion or grew by 468% in 2017. Meanwhile, for domestic investment in 2017 reached IDR.30 billion, an increase from the previous year which only reached IDR.3 billion or grew by 900% in 2017. The investment is the total investment in catch fisheries and

aquaculture. Whereas for the investment credit value in catch fisheries and aquaculture in 2017 of IDR. 1.007 billion, this value increased from the previous year which only reached IDR.588 billion or increased by 71.26%. Overall investment in catch fisheries and aquaculture grew by 96.81%.

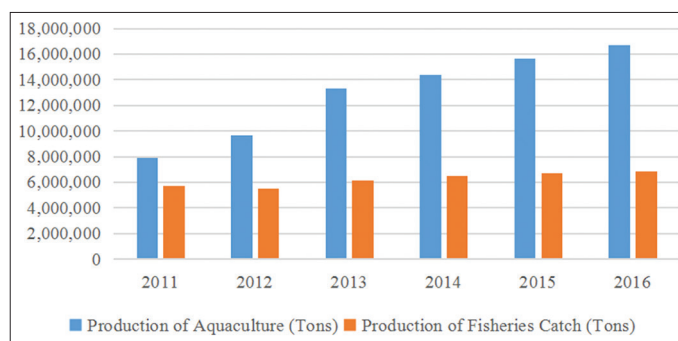
In Table 1, shows the trade balance performance of China, Indonesia, Thailand, Viet Nam, Philippines, Malaysia and Singapore in the fisheries sector. Nominally, Indonesia is under China and Viet Nam, but from the growth of the trade balance, during 2012-2016, the growth of Indonesia's trade balance averaged grew of 2.67% (Table 1).

Figure 2: The trend of fisheries production and consumption total in Indonesia, 2011-2016



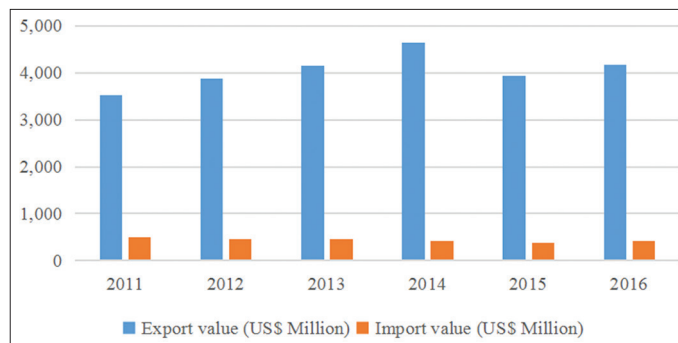
Source: KKP and BPS, Indonesia Statistics, processed

Figure 3: The trend of fisheries production total in Indonesia, 2011-2016



Source: KKP and BPS, Indonesia Statistics, processed

Figure 4: The trend of fisheries export and import value total in Indonesia, 2011-2016

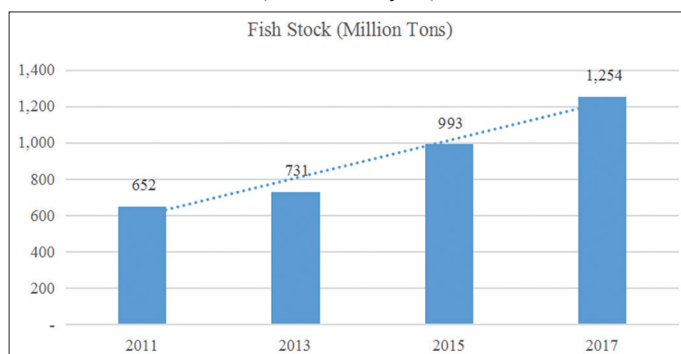


Source: KKP and BPS, Indonesia Statistics, processed

Table 1: The trend of Indonesia's trade balance growth with several competing countries (Thousand USD), 2012-2016

Countries	2012	2013	2014	2015	2016	Average growth (%)
China	11,270,507	11,761,796	12,649,812	11,504,690	11,452,509	0.60
Indonesia	3,408,381	3,642,666	4,158,516	3,499,954	3,691,279	2.67
Thailand	4,823,527	3,704,161	3,644,042	2,840,139	2,452,222	-15.14
Viet Nam	5,246,212	5,712,248	6,489,084	5,196,691	617,888	-21.39
Philippines	665,971	1,011,938	881,294	503,533	386,788	-6.75
Malaysia	-246,153	-298,796	-288,646	-288,554	-262,528	-2.23
Singapore	-702,110	-686,932	-742,566	-674,051	-779,759	-3.10

Source: KKP and BPS, Indonesia Statistics (Processed)

Figure 5: The potential of fish resources (MSY) in Indonesia (million tons/year)

Source: KKP, KEPMEN No. 50/KEPMEN-KP/2017, processed

Meanwhile, China's trade balance grew only by 0.60%, while Viet Nam has negative growth with an average of -21.39%. Likewise, the trade balance of other countries such as Thailand, Philippines, Malaysia, and Singapore which grew negatively, i.e., by -15.14%, -6.75%, -2.23% and -3.10%. There are many factors that drive an increase in trade balance such as the fish caught quality, quality assurance, services, and technology used. In free trade, the most important is the level of confidence of importing countries whose role is to strengthen the competitiveness of companies. For industries that market nearly 90% of the products they produce to export markets, meeting customer satisfaction is indispensable to maintain their market share from competitors from overseas and domestic companies. Product suitability with customer demand, availability of product supply for consumers, and the delivery of products are timely and quantity because it's the major factor in increasing fishery exports in Indonesia.

Based on data from FAO, in 2012, Indonesia was ranked second for the world's marine capture fisheries production, ranked fourth for aquaculture production in the world, and ranked second for seaweed production in the world. Since the last few years, capture fisheries have experienced a slowdown in production growth and the trend has stagnated. This is because the quantity of catch that has approached sustainable catch production (maximum sustainable yield) of 6.5 million tons per year, with the total allowable catch is 80% of MSY.

During 2011-2017, the MSY average grew of 9.1 million tons per year. In 2017 the estimated reach of 12.5 million tons per year (Figure 5). Currently, efforts to manage fishing in the sea are more directed at controlling and structuring production factors to produce sustainable use. Furthermore, efforts to increase

aquaculture production need to pay attention to the environmental carrying capacity, including related to water quality and pollution that may occur due to excessive feeding, as well as new land clearing for fish ponds or ponds (Diana, 2009).

Implications and results of internal and external evaluation of the fisheries sector in Indonesia, we made a strategy analysis through mapping strengths, weaknesses, opportunities and threats, from the results of the mapping, we formulated four strategy quadrants, i.e., (1) strategies to encourage strengths and take advantage of opportunities (SO strategy); (2) strategies to overcome weaknesses and take advantage of opportunities (W-O strategy); (3) strategies to encourage strength and minimize threats (S-T strategy); and (4) strategies to overcome weaknesses and minimize threats (W-T strategy). The strategy will be presented in the form of a matrix such as Table 2.

4. CONCLUSIONS

Conclusions from the results of this study indicate that the performance of fisheries in Indonesia has improved, this performance is shown from (1) the average growth of fisheries production and consumption of 5.35% and 6.88% during the period 2011-2016; (2) the average growth of export value of 3.95%, and a decrease in import value of -2.96% during the period 2011-2016; (3) investment growth in the fisheries sector by 96.81% in 2017; (4) average trade balance growth of 2.67% during 2012-2016; and (5) the average growth of the quantity of catch that has approached sustainable catch production (MSY) of 9.1 million tons per year or grew by 24.75% during 2011-2017.

The formulated of strategies for encourage strengths and take advantage of opportunities i.e. (1) Increasing the competitiveness of capture fisheries products; (2) providing certainty in the business spatial planning of catch fisheries and aquaculture; (3) improve the efficiency of small-scale catch fisheries business and meet an economy of scale; (4) providing access to financial and banking institutions for small-scale fishermen; (5) eradication of IUU fishing activities; (6) improve the quality and welfare of fishermen and fisheries workers; (7) Improvement of facilities and infrastructure for the management of catch fisheries data and information; and (8) optimization of national capture fisheries production through rationalization of capture fisheries fleets.

The formulated of strategies for overcome weaknesses and take advantage of opportunities i.e.: (1) Improve the quality and welfare of fishermen and fisheries workers; (2) providing certainty in the

Table 2: SWOT analysis

SWOT evaluation result	Internal evaluation	
	Strength (S)	Weakness (W)
	<p>Indonesia is the largest archipelago in the world with 17,504 islands</p> <p>Sea area of 5.8 million km²</p> <p>The territorial sea area of 0.3 million km², the total area of the archipelago 2.95 million km²</p> <p>The area of the ZEEI 2.55 million km²</p> <p>Potential marine flora and fauna diversity</p> <p>Potential marine and aquaculture fisheries resources</p> <p>International trade potential</p> <p>Competitiveness of capture fisheries and aquaculture products</p>	<p>Low of fish farmer business scale, the high production cost and the high price of feed</p> <p>Hard access to the domestic market for catch fisheries and aquaculture products, and low of fish quality</p> <p>The weak institutional capacity of supervisors and law enforcement</p> <p>Access to capital for the development of limited capture fisheries business</p> <p>The quality of fishermen is still relatively low, both from technology and production systems</p> <p>The certainty of the spatial business of aquaculture</p>
External evaluation		
Opportunities (O)	Strategy S-O	Strategy W-O
Encourage investment in the fisheries sector	Increasing the competitiveness of capture fisheries products	Improve the quality and welfare of fishermen and fisheries workers
Increasing production and consumption fisheries	Providing certainty in the business spatial planning of catch fisheries and aquaculture	Providing certainty in the business spatial of capture fisheries and cultivation
Increasing the welfare of fishermen and aquaculture farmers	Improve the efficiency of small-scale catch fisheries business and meet an economy of scale	Creating a system of marketing and distribution of catch fisheries products that are efficient, safe and quality.
Increased economic value of the environment	Providing access to financial and banking institutions for small-scale fishermen	Increased empowerment of small-scale fishermen businesses
Enforce the law against IUU fisheries	Eradication of IUU fishing activities	Improving the quality of human resources for capture and aquaculture fisheries data management
Increased access to domestic and international markets	Improve the quality and welfare of fishermen and fisheries workers	Development of small-scale fishing businesses through STP programs to improve access of technology and information
Increased export of catch fisheries and cultivation	Improvement of facilities and infrastructure for the management of catch fisheries data and information	Increased capture fisheries business partnerships through business incubator programs and mutually beneficial cooperation patterns of both parties
Development of fishing business with a fleet or group system through strict and clear regulations related to transshipment of catches	Optimization of national capture fisheries production through rationalization of capture fisheries fleets	
Development of branding of aquaculture and catch fisheries products through the promotion and packaging of healthy and attractive products		
Threats (T)	Strategy S-T	Strategy W-T
The rise of IUU fishing, both by foreign fishing vessels and Indonesian fishing vessels	Increase the effectiveness of the implementation of catch fisheries management based on the carrying capacity of aquatic ecosystems	Increasing the effectiveness of law enforcement through strict and effective sanctions against violators of catch fisheries regulations
Overfishing in coastal waters	Eradication of IUU fishing activities	Determination of the optimal allocation of fishing boats in each of Indonesia's marine waters
Data collection systems for capture and cultivation fisheries that are not yet reliable, not efficient and still partial	Improve the institutional capacity of fish resource supervisors and the effectiveness of law enforcement	Institutional capacity building for fisheries supervisors
Decreased water qualityw	Providing certainty in spatial planning for aquaculture business	Maintain and restore the abundance of fish resource availability (SDI)
Climate change	Improved quality and quantity of capture and cultivation fisheries data and information	Reliable and integrated capture fisheries data collection and information system
	Improving the quality of human resources for capture and cultivation fisheries data management	Providing certainty in spatial planning for aquaculture business
	Maintain and restore biodiversity in Indonesia's marine waters	Protection, preservation and sustainable use of fish resources and the environment
	The use of balanced and sustainable fish resources	

ZEEI: Indonesian exclusive economic zone, IUU: Illegal, unregulated, and unreported, STP: Science and techno-park, Source: Authors

business spatial of capture fisheries and cultivation; (3) creating a system of marketing and distribution of catch fisheries products that are efficient, safe and quality; (4) Increased empowerment of small-scale fishermen businesses; (5) improving the quality of human resources for capture and aquaculture fisheries data management; (6) development of small-scale fishing businesses through science and techno-park programs to improve access of technology and information; and (7) increased capture fisheries business partnerships through business incubator programs and mutually beneficial cooperation patterns of both parties.

The formulated of strategies for encourage strength and minimize threats i.e.: (1) Increase the effectiveness of the implementation of catch fisheries management based on the carrying capacity of aquatic ecosystems; (2) eradication of IUU fishing activities; (3) improve the institutional capacity of fish resource supervisors and the effectiveness of law enforcement; (4) providing certainty in spatial planning for aquaculture business; (5) improved quality and quantity of capture and cultivation fisheries data and information; (6) improving the quality of human resources for capture and cultivation fisheries data management; (7) maintain and restore biodiversity in Indonesia's marine waters; and (8) the use of balanced and sustainable fish resources.

The formulated of strategies for overcome weaknesses and minimize threats i.e.: (1) Increasing the effectiveness of law enforcement through strict and effective sanctions against violators of catch fisheries regulations; (2) determination of the optimal allocation of fishing boats in each of Indonesia's marine waters; (3) institutional capacity building for fisheries supervisors; (4) maintain and restore the abundance of fish resource availability (SDI); (5) reliable and integrated capture fisheries data collection and information system; (6) Providing certainty in spatial planning for aquaculture business; and (7) protection, preservation and sustainable use of fish resources and the environment.

REFERENCES

- Abowei, J.F.N., Tawari, C.C. (2011), Traditional fish handling and preservation in Nigeria. *Asian Journal of Agricultural Sciences*, 3(6), 427-436.
- Adisanjaya, N.N. (2009), *Potensi, Produksi Sumberdaya Ikan di Perairan Laut Indonesia dan Permasalahannya*. Bali.
- Ahmad, M.Z. (2011), *International Legal and Normative Framework for Responsible Fisheries, with Reference to Malaysia's Offshore EEZ Fisheries Management*. Wollongong: University of Wollongong.
- Andersen, P. (2015), The state of food security in Pakistan : Future challenges and coping strategies. *The Pakistan Development Review*, 49, 903-923.
- Anriquez, G., Stamoulis, K. (2007), Rural development and poverty reduction: Is agriculture still the key? *EJADE*, 4(1), 5-46.
- Daniel, C.R., Cross, A.J., Koebnick, C., Sinha, R. (2011), Trends in meat consumption in the United States. *Public Health and Nutrition*, 14(4), 575-583.
- Diana, J.S. (2009), Aquaculture production and biodiversity conservation. *BioScience*, 59(1), 27-38.
- Frohberg, K., Grote, U., Winter, E. (2006), EU Food Safety Standards, Traceability and Other Regulations. In *International Association of Agricultural Economists Conference*. Australia: International Association of Agricultural Economists. p1-18.
- Halim, D., Juanri, J. (2016), *Indonesia's Aquaculture Industry. Key Sectors for Future Growth*. Jakarta: Ipsos Business Consulting. Retrieved from: <https://www.ipsos.com/en/indonesias-aquaculture-industry-key-sectors-future-growth>.
- Håstein, T., Hjeltmes, B., Lillehaug, A., Utne Skåre, J., Berntssen, M., Lundebye, A.K. (2006), Food safety hazards that occur during the production stage: Challenges for fish farming and the fishing industry. *Revue Scientifique et Technique (International Office of Epizootics)*, 25(2), 607-625.
- Marschke, M., Wilkings, A. (2014), Is certification a viable option for small producer fish farmers in the global south? Insights from Vietnam. *Marine Policy*, 50, 197-206.
- Njai, S.E. (2000), *Traditional Fish Processing and Marketing of The Gambia*. Iceland: Fisheries Training Programme.
- Thornton, P.K. (2010), Livestock production: Recent trends, future prospects. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 365(1554), 2853-2867.
- Tidwell, J.H., Allan, G.L. (2001), Fish as food: Aquaculture's contribution. *EMBO Reports*, 2(11), 958-963.
- Vieira, L.M. (2006), The role of food standards in international trade: Assessing the Brazilian beef Chain. *Brazilian Administration Review*, 3(2), 17-30.
- Weinert, D.J. (2009), Nutrition and muscle protein synthesis: A descriptive review. *The Journal of the Canadian Chiropractic Association*, 53(3), 186-193.