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RESEARCH ARTICLE

Integration of food control system for international markets: Firm level adoption of standards in Myanmar fishery sector

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Abstract

Endowed with favorable geographical condition, Myanmar produced 4.14 million metric tons of fishery products in 2012. The recognition of Myanmar competent authority CA for fishery products export to EU was approved in 2009 resulting to 20 approved fishery processing plants in the EU publication list.

This study aimed at characterizing food control for the trans-boundary fishery trade specifically, from the points of view of both public food control provision and firm level adoption of food safety standards. Interviews with the responsible personnel from the Fishery Inspection and Quality Control Division were conducted. Field surveys were carried out at approved fishery factories to assess their adoption of private and public standards, to identify incentives for adoption of HACCP and to find out challenges in practicing food safety management system at the firm level.

This study showed that food control by the CA plays an essential role for the export success of firms. Regardless of how small or big the approved firms are and whether they possess private certificates or not. To comply with regulatory and customers' requirements and to get access to new markets are three major incentives towards the adoption of HACCP system. The need to retain trained production staffs and managerial staffs are two major challenges in the adoption of HACCP for the firms.

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I. INTRODUCTION

Food safety is the most highlighted issue in international trade due to the ever increasing consumers' demand, markets requirements, etc. It is no longer just a public health issue but also a market development issue (Unnevehr et al., 2003). Taking part in international trade demands government investments in quality infrastructure (Hochman et al., 2013). Thus export promoting policies will need to look well beyond tariffs and subsidies towards the establishment of standards (FAO, 2012). However, small producers of developing countries have been facing challenges in fulfilling export requirements mainly due to technical and financial limitations.

For reducing risks, requirements in the food production process were established, for example, the use of standardized practices such as Good Agriculture Practices (GAP), Good Manufacturing Practices (GMP), Good Handling Practices (GHP), and Hazard Analysis Critical Control Points (HACCP) along food chain. It differs from market to market. EU market based on EU directives food safety and sanitation, US market based on United States Food and Drug Administration requirements and Japanese market based on Food and Sanitation Law (De Silva, 2011). Among those markets, EU has been at the forefront in developing food safety standards and has a profound influence on the development of food export industry (Greenhalgh, 2004). Its' regulatory environment provides a wider range of cost-effective opportunities by closer collaboration between regulatory agencies and producers, while putting the safe food production responsibility on producers (Martinez et al., 2004).

Food safety standard can act both as a barrier to trade and as a basis of competitive positioning for developing countries in international markets (Henson and Jaffee, 2006). Public and private food safety standards are fundamentally about establishing controls and conformance in production, transport and processing of food (Henson and Humphrey, 2009). Raju (2002) suggested that a thorough understanding of prevailing business culture, policy support and direction are imperative, if HACCP-like food control system is required for safety. This study focuses on the provision of government food control for the trans-boundary fishery export and the adoption of food safety standards of the EU approved fishery processing plants in Myanmar. Food exporting countries want to participate in the world's largest food import markets. However, EU markets have the highest technical requirements. Some deficiencies of the Myanmar fishery food control system were found by the Food and Veterinary Office (FVO), the inspection mission of EU in 2009. Despite the fact that Myanmar produced 4.1 million metric tons of fishery products in 2012 (DOF, 2013), it was conceded that there was no strong brand image of Myanmar sea food in international market (CBI, 2013) however, neighboring countries (China, Thailand, Bangladesh) have been buyers and re-exporters of Myanmar fishery products.

The investigation was started in April and conducted in May and June 2014 in Yangon with two aims. The first aim is to examine the policy support and the food control system integration of the fishery competent authority CA for international markets. The second is to investigate incentives for and challenges to adoption of HACCP in the approved firms.

II. Methodology

Interviews with the responsible personnel of the Fish Inspection Quality Control Division (FIQCD): the delegated CA of EU, were conducted to get in depth knowledge.

The incentives to adopt the HACCP system and the accompanying challenges at firms were identified in Myanmar for the first time to assist policy makers. During the survey period, twenty fishery processing plants were approved in the national list of export to EU. Both primary and secondary data were used in this study.

To investigate at the firm level, interviews with eight processing factories and two jetties were made initially. The consent letters were received during the interviews. Questionnaires were then sent to all the 20 factories on line again for accessing incentives and problems related in HACCP system application particularly focusing on the firms' exports to EU. The response rate of the questionnaire was 85%. FIQCD helped the research team especially for answering interviews, providing data and communication with firms.

Furthermore, two forms of food control integrations were discussed: vertical integration of food control system at national level and horizontal integration of food safety management system FSMS at firm level. These integrations are observed as a recent trend of requirements in international food trade.

III. Result and Discussion

To expound on the theme of this study, this section is comprised of two main parts such as (1) vertical integration of the food control system at the national level and Myanmar fishery food control system integration and (2) horizontal integration of FSMS at the firm level and adoption of public and private standards in Myanmar fishery processing firms, and incentives and challenges in practicing food control. The first part is concerned with government food control and its requirements for the international markets, while the second part focuses on firm level adoption of standards and FSMS and also to delve into the challenges of the fishery sector mainly focusing on food control for further development.

3.1. Government Food Control System

To be able to export successfully, food production countries need to invest in their food control system with the continuous improvement made by integration of the system. For protecting the consuming public, the government needs a sound policy and operational coordination between government to government at the national level (Sarter, et.al, 2010). During the last decade, the integration of food control system in major food importing countries can be seen in the form of a closer collaboration vertically between CAs of export and import countries.

3.1.1. Vertical integration of food control system at government level The vertical integration of food control system can evolve with the following three stages.

At the initial stage, there is no delegated CA for food control in a specific food sector even though the country establishes all fundamental components of the food control system. Export is possible with end-product testing approach just before export. It may be due to weak capacity and also due to willing buyers' demand coming from outside of domestic but with a low price. At

this stage, food control for safety does not practice with food chain approach. Reactive measures will be taken if food-borne outbreak occurs which normally ends up with export rejection.

At the second stage, export country's CA could discharge its' functions after being approved by import country's CA through Mutual Recognition Agreement (MRA). In this case, there are generally three steps for CA to be approved such as (1) harmonization of rules and regulations with the import country, (2) verification visit of an inspection mission of import country and once the export-country demonstrates and fulfills the requirements of the import country during the visit then (3) mutual recognition between CAs starts. The MRA creates liberalized food trade environments cost-effectively without compromising food safety standards. Some countries like the USA and Japan do not follow this step, instead following Total Quality Management System (TQMS).

At the third stage, the effective utilization of a rapid alert system governed by CA through its website is practiced to control food borne illness incidents and to disseminate the real-time information as soon as possible. The rapid alert system of import country publishes approved factory lists on their web sites so that the import company can contact directly to the approved factory. It could prevent a common problem of technical regulation information gap between the trade promotion organization and national standard bodies, because export facilitation and quality regulation supervision are carried out by the same CA. If an incident happens in some cases, the alert system will publish the occurrence in a transparent manner. For example: Rapid Alert System for Food and Feed (RASFF) is the EU's alert system to ensure that urgent notifications are sent, received and responded collectively and efficiently (EU, 2014). It is a key tool to swiftly react when risks are detected in the food chain. RASFF database is an interactive searchable online database that gives public access to the transmitted RASFF notifications (EU, 2014). Table 1 shows the seven major export markets of Myanmar and their requirements at the second and third stages of vertical integration as follows:

Table (1)

According to Table 1, it can be seen that EU and China have integrated the food control systems vertically. US integrated completely also and has the same requirements at the second stage with Japan that lack the third stage so far. That type of vertical integration was initiated by EU and followed by China, Vietnam and ASEAN¹ with varying degrees of intensity. Up to 2014, twenty Myanmar fishery factories were approved for EU markets, seventy-eight factories for the China market and twenty-four factories for the Vietnam market.

3.1.2. Food control system vertical integration in Myanmar fishery sector

Among all food sectors such as agriculture, livestock, animal husbandry, fishery, etc., the fishery sector is the only one that has reached at the second step of the vertical integration. In April 3rd 2009, the Department of Fishery (DOF) could successfully harmonize its legislation with EU rules EC.no.852/2004 and EC.no.853/2004, by promulgating with the directive number 3/2009. It is also called legalization of EU rules for (fishery) export products for ensuring hygienic foods. This integration step is concerned with the food legislation, the first component of food control system.

Presently, Myanmar is listed in annex V, the list of beneficiaries Least Developing Countries (LDCs) under the EU's new Generalized Scheme of Preferences GSP -Everything but Arms-EBA, with 48 other countries. The FIQCD is the CA designated by the Ministry of Livestock, Fisheries and Rural Development and delegated by EU with the legislations that contain all powers necessary for the approval and listing of the processing establishments and all components of the supply chain (FIQCD, 2009). Facilitating technical needs for export success is the main responsibility of FIQCD (Wai, 2014). The aforementioned EC.852 and 853/2004 became the public standard of CA for international fishery trade on a voluntary basis. FIQCD categorized national approved lists into two such as (1) the source of raw materials-Jetty and (2) establishments-processing factory (Wai, 2014).

¹ASEAN encourages its member countries to integrate their food control system and to follow the food control integration practiced by EU member countries. However, most ASEAN countries were not ready to practice it in reality.

During 14th to 21st October 2009, the verification visit of the FVO² was carried out after checking the pre-mission questionnaire to access and report the compliance situation in the fishery supply chain. Then, FIQCD became recognized by the CA of EU, DG-SANCO or the Directorate General for Health and Consumer Affairs of the EU leading to the mutual recognition between the CA of Myanmar fishery, FIQCD and CA of EU, DG-SANCO. FIQCD is also a corresponding authority in dealing with DG-SANCO and the delegated authority for controlling purpose along the fishery supply chain.

It is mandatory that fishery processing plants need to be approved by CAs for export access to EU countries. In the Inspection and Certification Section ICS of the FIQCD, altogether 29 inspectors were well trained through a standardized in-house training. As regard to the laboratory service, it is an ISO-17025 accredited laboratory³ that checks the sample of products of the approved factory on a monthly basis. The inspection and certification section and the laboratory service are regarded as “Official Control” and “Official Analysis” of fishery food control system (FIQCD, 2009). The approval decision will be made on the status of application. The successful applicant shall be entered into the national approved list while unsuccessful applicants will be provided with a list of non-compliant items to be corrected for re-assessment.

Information sharing and education through training intervention are at the core of the effective utilization of food control system and traceability. Trainings for inspectors and food business operators (FBOs) of firms are provided by the FIQCD. Attending four types of training such as HACCP basic training, Quality Audit/Quality Control (QA-QC) training, Lab-test training, other processing related training is compulsory for HACCP team-members of fishery firms desirous of applying for the CA’s approval. Trace code must be clearly stated on each packing and carton, for informing the consumer about the products and for traceability purpose. The rapid alert system is also used in ensuring the rapid cross-border flow of information. Among seven major markets of Myanmar, five have their own websites⁴ for publishing the approved factory list and for sharing defect via the alert system in the fishery trading (see Table 1 for detailed information).

Since CA started its’ new food control function in 2009, RASFF notification numbers have been reduced dramatically and export volume has increased as expected. The official control plan of CA stated that FIQCD’s Incident Management Team-IMT⁵ will investigate, if it receives RASFF notifications from EU’s CA, along two parallel fronts (1) elimination of the remaining risks along the food chain and (2) clearing up the causes of non-conformance (FIQCD, 2009).

Myanmar fishery exportable items to EU are only from wild-caught, the primary fishery item that does not have chemical usage at the production area: at sea. The establishment of National Residue Monitoring plan is being planned to be able to export aquaculture products. That will be a huge step of technical and financial investments for the CA and firms.

3.2. Horizontal Integration of FSMS at firm level

The ultimate responsibility for achieving food safety lies in the hands of production firms i.e., food business operators. The capacity of integration depends on their ability to follow. It is still obligatory that fishery processing plant needs approval of CA as a mean to integrate FSMS. In what way firm enhances FSMS horizontally, the adoption of public and private standards, and incentives and challenges of the surveyed firms were discussed in the following part.

3.2.1 Horizontal Integration The horizontal integration of FSMS at the firm level can be identified with three stages as follows.

At the initial stage, a firm does not have any certificate to be proven for safety. The absence of a certificate limits market access, but then FSMS can be started by acquiring single certificate from either public or private sources. So, the acquisition of the single certificate can be regarded as the second stage because products differentiation achieved by effective utilization of HACCP system enhances the firms’

²It came to Myanmar with their own expense, upon the request of FIQCD. FVO publishes finding of their on-site inspection (downloadable via online) and the CA of the third country could address the shortcomings by presenting the action plan to the FVO (Khoi, 2008)

³It is the only one laboratory that possesses ISO 17025 certificate: Good Laboratory Practice GLP, among all laboratories run by government. Even Food and Drug Administration FDA’s laboratory does not have that certificate.

⁴ASEAN rapid alert system allows only ASEAN State network members to access certain information and functions in the website (ARASFF, 2014).

⁵Team members of IMT will be from the key Central Competent Authority CCA of DOF, such as director of FIQCD, the head of inspection and the analytical experts (FIQCD, 2009).

competitiveness to increase sale in the markets. However, the cost of compliance could be burdensome particularly for food businesses in developing countries. In this regard public food safety program at the national level could contribute towards overcoming that barrier (FAO, 2010). At the third stage, the firm would acquire both private certificate and private certificates so as to enhance its reputation and to expand to potential lucrative markets.

3.2.2. Adoption of private and public standards in Myanmar fishery firm In this study, both public and private standards adoption are voluntary and so firms are free to choose and can apply as long as they have desire and capacity. Private standards encompass any standards developed by an entity outside of government (ISO, 2010) and are remarkably varied with respect to who they are developed by, who adopts them, the issues they address, etc. (Henson and Humphrey, 2008).

Standards can be classified into process standard and product standard. HACCP is the process standard mandated for EU markets and it must be controlled by public authority. The product must be processed by a HACCP certified factory and must have well-informed labels on package including trace code.

Public standard for international market in Myanmar is governed by the FIQCD of the DOF. This study mainly focuses on twenty approved fishery firms for EU market⁶. In most countries, as a rule there are two costs borne by firms such as the cost paid to CA for supervision and the cost for the correction of non-compliance (NC). For the case of Myanmar, the fishery firm does not need to pay CA for the supervision; it just have to correct NC verified by the CA (Wai, 2014).

The main difference between public and private standard is eligibility or accessibility to export to EU. Only the firm which is approved by CA can export to EU, regardless of how many private standards they acquired. It is a prerequisite for EU that export country's public authority with the necessary legal power ensures food control along the food chain in all relevant aspects of hygiene, public health and animal health (EU, 2007).

The additional difference is the compliance cost of standard to be approved. As mentioned above, there is no need to pay for the public standard in Myanmar whereas there is a need to pay for the private standard. For both standards, the cost for correction of non-compliance solely depends to which extent corrective action is needed to meet the HACCP requirements. Private standards used by fishery firms are with ISO series of 9000, 22000 and 14000.

Figure (1)

In 2009, there were only 8 approved factories in the CA list. The number rose to 13 in 2013 and by 2014 April there were 20 approved factories for the EU markets. Among them, 40% had ISO 9000 series while 10% of them possessed ISO 22000. Only one processing company had 14000 series. It is understood that all the approved factories had already been checked and verified by the CA, but the production capacity, cold store rooms, air blast freezers installed varied in quantity with each factory. Among twenty approved factories, 17 approved factories (85%) responded to the questionnaires mainly focusing on the adoption of standards, firms' size and FCMS at firm level. The following is a more detailed discussion on the private fishery processing plants.

- (1) **Possession of private standard** 59% of the respondents did not have private standards including ISO. Among them, more than half of them did not have a plan to apply for private standards in the future for the integration of their FSMS horizontally.
- (2) **Percentage of export in total production** Nearly half or 47% of all factories exported less than 25 percent of its total production, to EU countries. Only 6% exported 50 to 75 percent of its total production. 11% of the factories exported more than 75 percent of its total production.

Figure (2)

- (3) **Size of the approved firms** The number of employees and investment amount are important criteria to determine the size of firms. The firms are classified into three categories such as firms with less than 100 laborers, firms having laborers between 100 and 300, and firms with more than 300 laborers. Only 18% of the approved firms had more than 300 employees, 47 % have between 100 and 300 and 35% hired less than 100 employees. The minimum investment amount of these factories was two million US \$, however investment data were not made available by all factories.

⁶ EU market is important for Myanmar fishery sector in term of high food safety regulations. Being recognized by EU is a remarkable achievement for developing country like Myanmar (Wai, 2014).

- (4) **HACCP plan** The number of HACCP plan for products varied with the range between 1, the minimum HACCP plan number to 41, the maximum. All factories have its own mini lab and could perform three main tests such as TPC total plate count, coliform and E.coli test.

3.2.3. Incentives for and challenges to application of HACCP system

(1) **Incentives** To comply with the regulatory requirements was the major incentive for all respondents. To comply with customers' requirements and to get easy access to new markets were also two other major incentives for almost all (94%) of the factories. Most of factories (88%) used HACCP for the improvement of product quality. Reduction of production cost was just a minor incentive for most 76% of them. These results agree with the pattern seen in the Mexican pork industry as studied by Em- Maldonado et al. (2009).

(2) **Challenges** The need to retain trained staffs and trained managerial staffs were the major difficulty for 53% of the factories. The introduction of new products was not a challenge for 71% of processing plants and just a minor challenge for 18% of the factories. Table 2 shows detailed results on the challenges facing the application of HACCP in the approved fishery firms.

Table (2)

For all the approved firms, in-house trainings for employees were provided by QA/QC members initially trained by the CA. The time taken for the approval varied according to the compliance status identified by the CA and it took at least six months. It was highlighted during interviews that if the firm pays attention in acquiring more HACCP plans approved by the CA, then they can export more varieties of products without worrying about any particular resource shortage. It is cost effective for firms in developing countries if the responsible authority is competent in managing the food control system of a specific sector. The CA itself needs integration along with its food control system's components. Firms' size and the possession of private standards do not matter for firm to become an approved firm. As long as the FSMS of the firm is horizontally integrated by acquiring the public HACCP certificate under CA's supervision, it can be listed as an approved firm of the CA and can take part efficiently in international markets.

Figures

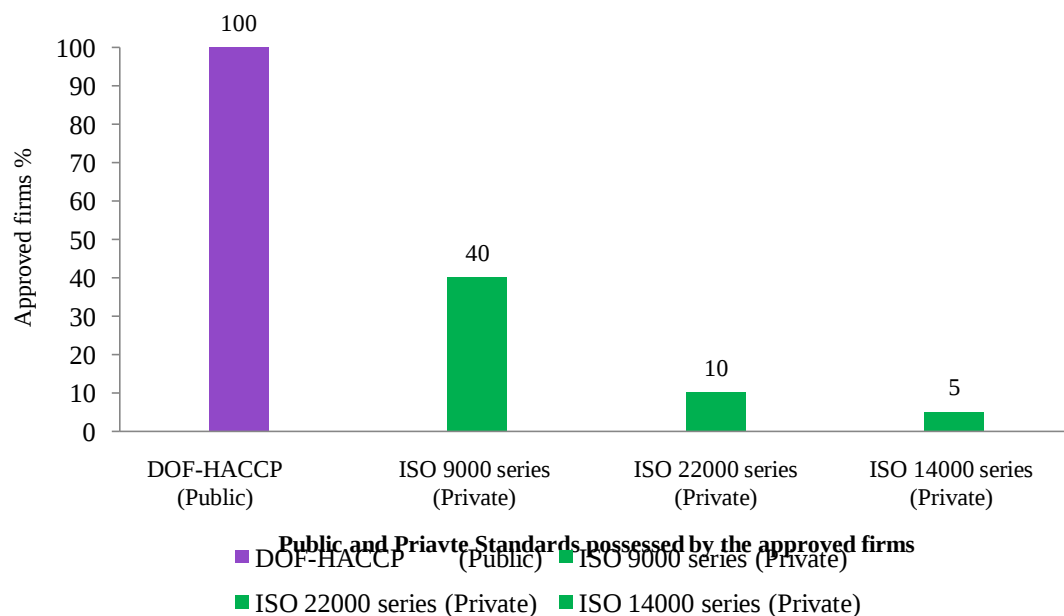


Figure (1) Approved firms and public and private standards possessed

Four groups of approved processing plant based on amount of Export in total production

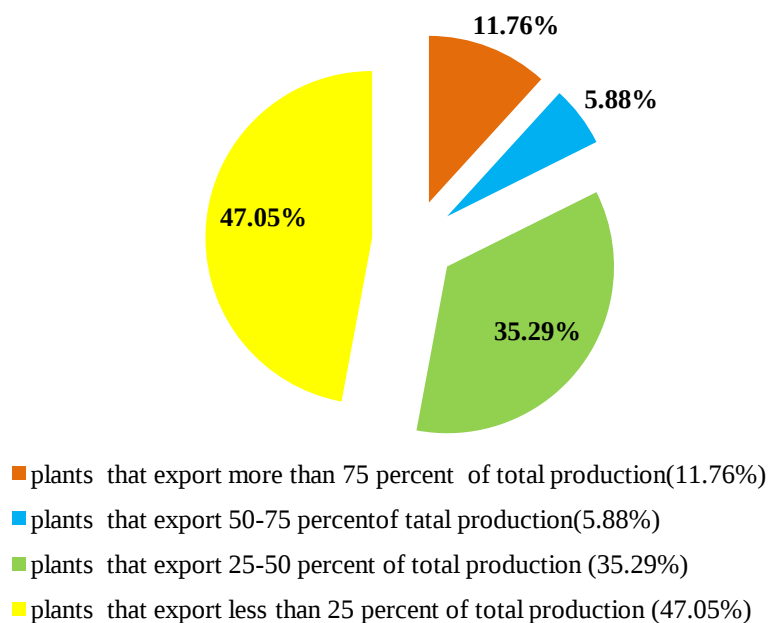


Figure (2) Processing plants classified based on the amount of export to EU

Tables

Table 1: Requirements of major markets in vertical integration and approved factory lists

	Import Country/ Markets	2 nd stage of vertical integration			3 rd stage of vertical integration	Number of Myanmar fishery factory approved by import country CA
		(1) Harmonization	(2) Verification Visit	(3) Mutual recognition between CAs	Alert system web-sites	
1	EU	Required	Required	Required	RASFF	20
2	Japan	Not necessary	Not necessary	Not necessary	-	*
3	USA	Not necessary	Not necessary	Not necessary	US-FDA	* (exporters/factory can apply directly to US-FDA)
4	China	Required	Required	Required	CNCA-AQSIQ	78
5	Vietnam	Required	Not yet	Required	NAFIQAD	24
6	ASEAN	at preparation stage	Not yet	Not yet	ARASFF (ASEAN alert)	*
7	GCC countries	Not necessary	Not necessary	Not necessary	-	*

Legend

1.RASFF Rapid Alert System for Food and Feed

- 2.US-FDA U.S. Food and Drug Administration
 3.CNCA Certification and Accreditation Administration of the People's Republic of China
 4.AQSIQ General Administration of Quality Supervision, Inspection & Quarantine of China
 5.NAFIQAD National Agro Forestry Fisheries Quality Assurance Department
 6.ARASFF Asean Rapid Alert System for Food and Feed
 7. * Processing factories are not necessary to be approved by the CA of the import country

Table 2. Identification of Challenges faced by the approved fishery firms

		Challenge				No challenge		Result	Finding in Rank	
		Major		Minor		PP	%		Major	Minor
		PP	%	PP	%					
1	Need to retain trained production workers	9	52.94	6	35.29	2	11.76	Major (53%)	1 st	
2	Need to retain trained supervisory/managerial staffs	9	52.94	6	35.29	2	11.76	Major (53%)	1 st	
3	Attitude /motivation of production workers	6	35.29	10	58.82	1	5.88	Minor (58%)		1 st
4	Attitude / motivation of supervisor/managerial staffs	7	41.17	7	41.17	3	17.64	Major & Minor (41%)		3 rd
5	Reduced flexibility of production staffs	1	5.88	3	17.64	13	76.47	No (76%)		
6	Reduced staff time available for other tasks	2	11.76	3	17.64	12	70.58	No (70%)		
7	Recouping cost of implementing HACCP	4	23.52	8	47.05	5	29.41	Minor (47%)		2 nd
8	Reduced flexibility to introduce new products	2	11.76	3	17.64	12	70.58	No (71%)		
Legend										
1. PP the number of the approved processing plants										

IV. Conclusion

The plethora of private standards and their associated costs as well as the technical requirements demanded by lucrative markets make it difficult for firms of developing countries to enter into international markets. Fortunately, EU's new food control regulatory environment offers food production firms in developing countries more access in the competitive international markets. One of the opportunities is dual integrations involving the vertical integration at the government level and the horizontal integration at the firm level. At the national level, Myanmar fishery food control system was found to be vertically integrated at the second stage. FIQCD leads in its competency among all other food sectors, even though it still has some shortcomings in integration. It promotes trade by facilitation technical needs supported for domestic firms and controls food quality for safety along the food chain. Private fishery firms play an important role in the export business; however their FCMS must be horizontally integrated under the control of the CA for ensuring food safety. They are producers as well as exporters who borne the cost of compliance. Thus, export promotion policy should support private firms to pave the way towards export promotion. Furthermore, Myanmar fishery exportable items to EU was currently only from wild-caught sources and there is room to develop aquaculture for export diversification.

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Appendix

Incentives

1. Comply with regulatory requirements (Major, Minor)
2. Comply with customers' requirements (Major, Minor)
3. Increases products quality (Major, Minor)
4. Reduce products costs (Major, Minor)
5. Access to new market (Major, Minor)

Challenges

1. Need to retain production staffs (Major/ Minor/No)
2. Need to retain supervisory , managerial staffs(Major/ Minor/No)
3. Attitude /motivation of production staffs (Major/ Minor/No)
4. Attitude / motivation of supervisor/managerial staffs(Major/ Minor/No)
5. Reduced flexibility of production staffs(Major/ Minor/No)
6. Reduced staff time available for other tasks (Major/ Minor/No)
7. Recouping cost of implementing HACCP (Major/ Minor/No)
8. Reduced flexibility to introduce new products (Major/ Minor/No)

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