

Quality Assurance Systems for Fish Exports in Oman: Requirements and Choice¹⁾

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The General Agreement on Tariffs and Trade (GATT) recognizes the rights of importing member nations to maintain phytosanitary regulations to protect domestic human health. As a consequence, international certification in quality control has become a requirement for competing in world markets. The two most common forms of certification are the HACCP and ISO 9000. This study reviews the role of these international certification bodies as trade facilitators in the light of recent agreements. It shows that both systems could lead to increased trade flows but are not necessarily exclusive. The focus of the paper is Oman fish exports and the need of quality control systems to maintain market access.

International standards for food sanitation and quality control have been mostly motivated by a desire to improve food safety. In recent years, these systems have become almost indistinguishable from Total Quality Management (TQM) (Mazzocco, 1996; Zaibet, 1996). Little, however, has been mentioned about the role of these standards as potential determinants of market access and trade conduct. For food regulators, trade conduct is important but often is a secondary goal of the adoption of quality regulations (Caswell and Hooker, 1996). This paper discusses the role of international standards as facilitators of trade conduct and the requirements for developing country exporters to meet the standards.

The General Agreement on Tariffs and Trade (GATT) and its successor the World Trade Organization (WTO) continues the process of reducing tariff-levels on agri-food products. There is a strong emphasis on increasing the openness and transparency of national-level food regulations. Nevertheless, these agreements allow importers to require imported food products to meet domestic quality standards without violating restrictions against trade barriers (GATT, 1994). The Sanitary and Phytosanitary Agreement of the GATT will require developing nation food processors to adopt recognized quality control standards such as HACCP. Developing nation food suppliers are affected by the trend towards quality control systems. Legislation for product safety may not exist at the same level in the

developing nations, resulting in production practices that are not in line with the health standards in the industrialized markets. One way to insure continued market access is to adopt an internationally accepted quality control system. In many developing countries, government agencies can play a key role by encouraging and assisting the private sector to obtain the certification.

To remain competitive, developing nation food exporters will have to adopt a quality control system. An economic analysis of developing nation processed food export sectors cannot concentrate on price competitiveness alone, but should include market access through quality control. This study examines the impact of quality control systems on trade of fish products with emphasis on developing nations. An example from the Sultanate of Oman will be used to illustrate the current status and the requirement to meet the standards.

International Certification options for fish exporters

Technical barriers to trade were addressed in recent multilateral trade negotiations of the GATT, leading to adoption of the Sanitary and Phytosanitary Agreement. The issue of technical standards is very important for food processors. Developing nations with new food processing sectors should be espe-

cially interested in the affect of quality standards on export markets. Regulations in Europe and the U.S. will require substantial investment in quality control systems to maximize export earnings for developing nations, many of whom are counting on exports to lead their economic growth (FAO, 1995).

The two important quality control systems are ISO 9000 and HACCP. HACCP applies to foodstuffs and is a required system, whereas ISO 9000 is a voluntary standard generic operating procedure for all industries. Current food safety legislation in the European Union and in the United States of America on food safety and risks make HACCP the system of choice. On the other hand, the ISO 9000 quality system is widely used in industry and represents a valuable quality system to facilitate trade flows. A survey of fish processors in the United Kingdom revealed that 13 percent of fish processing firms use ISO 9000 (Bredahl and Zaibet, 1994). This number has continued to increase following the passage of the 1990 Food Safety Act in the United Kingdom.

ISO 9000 standards detail internationally accepted guidelines for maintaining a consistent quality in product design, production, installation and servicing, and practices for certification (Brian, 1991; Rabbit and Bergh, 1993). The standards are a generalized management system that can be applied to industries as diverse as food processing and the manufacture of electronic components. The International Standards Organization, headquartered in Geneva, Switzerland, developed the standards for many activities that facilitate international commerce: common definitions of products and procedures, accepted testing and sampling procedures, and characteristics of quality assurance programs. The standards are based on BSI 5750, the quality assurance standards developed by the British Standards Institute. They have been accepted at the European level as EN 29000, and in the United States as Q90-4.

HACCP plan was developed in the United States to reduce the risk of pathogens in the processing of food products. The origins are derived from the U.S. space program and the need for quality control in food processed for astronauts in space, to reduce illness

or downtime. In the 1970s, the process was adapted for quality control in the fish processing industry by the U.S. Department of Commerce National Marine Fisheries Service. HACCP has been adopted by the European Union and the United Nations' food standards body, the Codex Alimentarius Commission in 1993 (codex, 1995). FAO considers HACCP as a basis for food quality but recognizes the difficulties faced by developing countries in implementing these advanced food quality systems (FAO, 1994)

The role of HACCP management system is to reduce hazards exposed to the product during processing and handling (Seafood International, 1996). These hazards, such as microbiological contamination, pose risks to consumer health. The proper management of food processing occurs when these hazards are recognized and a plan is implemented to systematically reduce the risk of the hazards. For example, proper procedures for icing fish, from initial contact with the fisherman, to final product (canned or filleted fish), may be documented and implemented to insure potential hazards from contamination are minimized. Some varieties of fish may be more prone to contamination and require more stringent quality control procedures than other varieties. The HACCP procedure is specie specific and dependent on the level of processing. Processors following the HACCP for their particular products will be certified by the appropriate U.S. agencies as producing a product that is safe for human consumption. The U.S. Department of Commerce, the U.S. Food and Drug Agency, and the U.S. Fish and Wildlife Service are authorized to monitor product quality under HACCP certification. Customers of these products can be assured that safety precautions are taken in the processing and handling of the product.

HACCP is an example of the application of a mandatory food safety approach. It has become a mandatory system for fish products sold in the U.S. and for U.S. fish products destined for the European Union (EU) market since December 1997 (FDA, 1995). The EU adopted HACCP-based regulatory regime in Directive 93/43 (EEC 1993). Currently, HACCP is part of national legislations in all member countries (Ziggers, 1998). Current discussions (by WTO and

FAO) on food quality make HACCP the preferred system and encourage member countries to ratify to codex HACCP standards (Caswell and Hooker, 1996). For developing countries this implies that the implementation of a HACCP system should be part of the regulatory environment.

The U.S. Department of Commerce presents a broader definition of HACCP which is more in line with the ISO standards: “enhance and recognize quality control / quality assurance systems to produce and market products which can be identified and meets the consumer’s needs or desires” (NMFS, 1996). The HACCP plan includes minimum technical procedures for protecting the public health and safety. ISO 9000 standards specify general elements that quality management systems must have to produce final products that consistently meet required specifications. Our review of both systems shows that the HACCP system can be considered a subset of an ISO 9000 management plan. The scope of ISO and HACCP stan-

dards presented in Table 1 shows that the seven principles of the HACCP system are included in the elements of an ISO management system. ISO approach certifies the existence of a quality management system rather than specifying standards for products. Moreover, ISO has been adopted as part of TQM, which leads to product improvement as well as increased productivity and competitiveness. From the above analysis, we may conclude that both systems are beneficial in facilitating international trade but not necessarily exclusive.

The economics of food safety and quality control regulations stems from the existence of a failure in the market for safety attributes. Although many food quality components could be met through free contracting between trading partners, certain quality specifications involve irreversible health consequences and should be monitored through safety regulations (Sheldon and Von Witzke, 1992).

Table 1 ISO and HACCP standards (Bredahl and Zaibet, 1995; NMFS, 1996)

ISO 9000	HACCP
Based on twenty principles:	Based on seven principles:
1. Define management responsibility and quality policy,	1. Assess the product hazards,
2. Develop quality system,	2. Identify control points and determine which are critical control points,
3. Contract review with customers,	3. Establish critical limits,
4. Design control,	4. Establish monitoring procedures,
5. Document and data control,	5. Establish corrective actions,
6. Purchasing procedure,	6. Establish a record keeping system,
7. Control of customer supplied products,	7. Establish verification procedures.
8. Product identification and traceability,	
9. Process control,	
10. Inspection and testing,	
11. Inspection, measuring and test equipment,	
12. Inspection and test status,	
13. Control of non-conforming products,	
14. Corrective and preventive action,	
15. Handling, storage, packaging and delivery procedure	
16. Control of quality control,	
17. Internal quality audits,	
18. Training program,	
19. Servicing (when applicable),	
20. Statistical techniques.	

It is recognized that most fish traders are well trained and have strong knowledge and ability to evaluate the quality of fisheries products before being sold in the retail markets. Also, current EU fish regulations involve directives laying down conditions for fisheries products entering from third countries (OJ-EU, 1991). The directives include inspections to be carried out on the spot by experts from the EU to ensure the safety of imports. These regulations require information on the legislation of the exporting country, the competent authority as well as the actual health conditions along the production chain. These measures are to ensure the safety of final products and reduce market failure problems.

Firm-specific investment in quality control is a means to reduce (not eliminate) inspection efforts and border-checks. A system based on HACCP is a signal concerning non-visual qualities of the product, such as microorganism contamination introduced during handling. These signals build a good reputation through recognized brand names or establishing product quality control certification. For fish products in general, brand names have not been common. This is partially the cause of the market failure in quality control for fish products. It is likely that quality control certification will assure retailers and consumers that the product is safe.

When transaction costs are added average costs of food exports increase. North (1990) considers transaction costs to be a major component of exchange costs. These costs include the cost of measuring, policing, and monitoring agreements since monitoring is not perfect. HACCP are specifically relevant to international trade because the certification mechanism lowers search costs for purchasing materials as well as lowering marketing costs in communicating the nature of quality system in place (Mazzocco, 1996).

On the other hand, the implementation of HACCP requires numerous investments. It is a concern in developing countries that the cost of implementing HACCP is high. Implementation costs depend not only on the requirement to meet the regulation but also on the current status of food safety-related practices of food processing plants. Measures of actual costs are difficult because of the diversity of cases. Some studies however

used a case study approach and showed that the costs are indeed very high (Coatore and Caswell, 1998). The implications are very significant for developing countries where the gap between current status of fish processing facilities and the requirement of HACCP is rather high.

A case study of Oman Fish Exports

The Sultanate of Oman has an extensive history of fishing as a livelihood, going back to ancient times. Over 40,000 tonnes of fish were exported in 1993 and again in 1994. This amounted to a value of over 50 million U.S. dollars each year. Oman has focused development resources on vertical expansion and modernization of the fisheries sector. In the 1980s, there were less than 10 fish processing factories in Oman. By 1995 there were 47 companies involved in fish processing. This industry has been key in employing rural Omanis and creating new job opportunities in the related processing, shipping, and exporting industries. The growth in income from the fish sector stimulates the whole national economy by creating service jobs supported by the fisheries income. Continued development of this sector has the potential to bring substantial foreign reserves into the country.

The GCC countries represent the major market for Omani fish in percentage of total quantity exported and should continue to be the focus on studies of market development. Forty-six percent of total exports went to the GCC market over the 1990-94 period. That is up from an average of 44 percent over the 1985-89 period. Exports to Europe doubled from an average of 5 percent in 1985-89 up to 11 percent over 1990-94. Exports to the U.S. market have remained low, falling from 2 percent in 1985-89 down to only 1 percent in the 1990-94 period.

A major difficulty for Omani processors is the increase in sanitary and phytosanitary regulations for world trade in fishery products. Recent trends in the U.K. (1990 Food Safety Act), the U.S. (1997 HACCP deadline) as well as the Codex Alimentarium

Commission and WTO have required foreign suppliers to insure the quality of their fish products by adopting quality control management systems. For the Seafood HACCP, adoption can occur at the national level, with government certification and monitoring for products exported, or through individual certification of fish processing companies by the importing nation's authorities. For private processors in developing nations, it may be more economical to develop national certification for export. This is due to economies of scale, spreading the average cost of adoption over all the exporting companies. Otherwise, the costs of training, inspection, and follow-up visits for an individual firm may be higher than the gains from exports, due to the typically small size of food processing firms in Oman.

Surveys by the authors (summer 1996) of the Omani fish processing sector have illustrated some areas that require improvements in quality control procedures to meet international certification. Some plants exhibited handling and storage techniques that do not meet HACCP (Al-Barwani, 1996). This is not a problem for fresh fish sold in markets that do not require certification, for example, countries in the Gulf Cooperation Council (GCC) market or fish meal producers. However, fish sold in Europe and North America must meet the quality standards in those countries. The lost opportunities for Omani fish products are illustrated by the price received for the product. The majority of Omani fish exports are selling below the world price, with the exception of a few specialized products by firms that have adopted strict quality control systems (Al-Hinai, 1996). These specialized high-value products are targeted in the niche markets in Japan and the United States. Assured quality levels resulting from adopting an HACCP system should raise the value per unit of fish, as well as increase total demand for Omani fish.

Quality control systems provide a common basis for an independent and transportable supplier qualification system, results in lower audit costs and helps to ensure buyers that specified practices are being followed, both important to enhancing and facilitating trade (Reimann and Hertz, 1993). Fish pro-

cessing companies in Oman are familiar with HACCP due to efforts by the Oman Chamber of Commerce and Industry (OCCI) and the Ministry of Agriculture and Fisheries. However, they are less familiar with ISO 9000. The Omani Government has made significant effort to acquaint companies with quality control systems. standards. The OCCI has sponsored training sessions on ISO for company managers. Omani fish exporting companies recognize the problem of price discounts for non-certified products in the U.S. and European markets. For example, tuna exporters have been receiving prices per kilogram well below the average world price (Al-Hinai, 1996). The same price discount applies within the Gulf market and for local fishermen. Fishermen are paid on an average product quality basis. This average quality is perceived to be low because fish processing companies are aware that fishermen are not using ice to preserve fish. The lack of ice while transporting fish results in relatively high rate of spoiled fish, given the hot climate of the region. In the absence of documented quality control procedures, this pricing scheme will prevail at the different levels of the Omani seafood chain. In addition, a market failure in fish products prevents consumers from determining which suppliers have low-quality fish. This market failure results in distrust of all fish products, regardless of individual quality.

The lack of development of quality control in the region may be due to GCC consumer perception of fish quality. Consumers in the GCC, the largest market for Omani fish, have not been sensitive to quality control in fish products. To the contrary, a recent survey of consumers in Oman indicated a high preference for fresh fish, without icing. Iced fish are at a disadvantage in the Gulf market (Houston, Al-Mazrooei, and Huang). However, the competitiveness of Oman fish exports outside the Gulf will depend on adoption of quality control certification. The Ministry of Agriculture and Fisheries has developed a set of standards, which include regulations on quality control for fish exports. The standards include regulations for criteria and standards of fish exports, hygienic regulations for food factories and their

personnel, and labeling of prepackaged foods with Omani standards. When implemented, these regulations will help increase the returns in foreign currency from the fishing sector. These regulations will also reduce wastage of fish resources from mishandling and spoilage. A System Audit Checklist is being developed for control visits to fish processing plants. On the basis of control visits, approval is given to complying plants and a quality control number (QC) is issued. Approximately 80% of registered plants have received a QC number to export fish. Non-approval of some fish plants are the result of various minor and major offences, such as the use of rusted instruments (trays and ice lift), non separation between the different operations, (reception of fish, cutting, cleaning and packing) or general lack of personnel hygiene.

A quality management system introduces efficiencies in processing and purchasing of inputs. HACCP insures not only protection from food contamination, but also generates efficiencies in overall management of the operation. These efficiencies are especially relevant for food processors in developing countries. Factories in Oman have typically been established with borrowed technology, not necessarily suited to the labor - capital mix in the country. By evaluating the processing system for quality control, inefficiencies in production practices can be identified. Because HACCP certification is ongoing, the processor will maintain the system to keep certification, insuring continued scrutiny of the production process. Costs of adopting quality control systems can be overly burdensome because the firms are generally small-scale. Under HACCP, each processor must develop a plan, which includes identifying potential pathogens for the product and each particular production process. Critical points must be identified throughout the handling process. This may require outside consultants who are experts in the industry. The processor will incur higher costs due to acquisition of new equipment and personnel, and training expenses. The difficulty for older firms is the cost of replacing obsolete technology, installing freezers and icing facilities as well as the added burden of training low-skilled workers basic hygiene practices. The

HACCP proposal must be reviewed and approved by the appropriate U.S. authority, which may require fees and travel reimbursement for inspectors. Regular systems audits and program evaluations add to costs of the program maintenance. The program may require additional personnel, as well as laboratory tests. It may be more cost effective for a government agency to sponsor training and certification sessions for all firms in the industry. This would reduce average costs per firm for foreign inspectors visiting local processing plants. The government may assist firms obtaining international certification to preserve export markets as well as protect domestic consumers. Assistance could include subsidies for adoption of quality control systems or exclusive access to export markets for firms incurring the costs of adoption. The Omani government has sponsored HACCP and ISO 9000 training workshops for food processors and subsidized modern inputs for fishermen by providing iceboxes, and fiberglass boats. By operating an extension program for fishermen, the government is indirectly assisting private processing companies. Benefits from these government-sponsored programs include potential financial gains to the nation from price premiums on fish exports and a reduction in spoilage of fish. Additional benefits include assured safety of the domestic food supply for Omani consumers and enhanced reputation and demand for Omani fish products.

Conclusions

The Omani fish processing sector has been encouraged by the government to expand to take full advantage of the national fish wealth. This expansion is targeted toward international markets, with high hopes for increased trade under the GATT agreement. To obtain the full potential from the fisheries sector and the comparative advantage of Omani fish processors, the private sector should continue to take steps in adopting international quality control systems. Currently the HACCP system is of major importance for exports destined to the lucrative

U.S. market, however, the future appears to center around ISO 9000, especially in the European markets. U.S. producers wishing to sell in Europe are adopting ISO 9000.

Omani fish processors face two difficulties. First, the quality of the raw product is not guaranteed. Despite government expenditure and extension work in the fishing sector, Omani fishermen have been slow to adopt sanitary handling methods for fish. The result is uncertain quality for the fish processing plant. No amount of quality control in the plant can improve the quality of fish that was not iced properly by the fisherman. This has led to a substantial loss in fish wealth through spoilage. This loss could be reduced by vertically integrating the fish processing industry to include the supplier of raw materials. Adoption of a quality control system would include a system for the raw products supplier. The second difficulty for Omani fish processors is the expense of adopting a quality control system. Smaller processors may have fewer gains to offset the high cost of adoption and

implementation. Omani companies may not have the capital or the trained personnel to implement a quality control system. This difficulty could be eliminated through government sponsored workshops on quality control systems. The net cost to the government may actually be reduced by redirected government assistance from fishermen to processors. The fishermen would gain indirectly through higher income from a greater volume of sales and higher price for an assured quality raw product.

Adoption of quality control systems by the private food processing sector could reduce costs to the government, raise the safety level of the domestic food supply, and increase the foreign currency earnings for the country. Developing nation governments should look closely at their food processing industries to discover ways of assisting their private sectors in adopting quality control systems to insure market access for value-added food products in the 21st century.

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Notes

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