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*Assessing the Impact of Food Quality and Safety Measures on the Agri-Food Sector in Developing Countries (Spencer Henson, The University of Reading, U.K., presiding)*

## **FOOD SAFETY REQUIREMENTS AND FOOD EXPORTS FROM DEVELOPING COUNTRIES: THE CASE OF FISH EXPORTS FROM KENYA TO THE EUROPEAN UNION**

**SPENCER HENSON, ANN-MARIE BROUDER, AND WINNIE MITULLAH**

### **Introduction**

A key element of the “globalization” of the world food economy is the development of global commodity chains, a key element of which is progressively greater levels of trade in agricultural and food products. Simultaneously, there has been structural change in the composition of world trade in agricultural and food products, with traditional export commodities, for example, coffee, tea, sugar, and cocoa, being displaced by so-called “high-value foods” such as fruit and vegetables, poultry, and fish (Watts and Goodman). In developing countries, this has given rise to what Friedmann (1993; 1994) calls “new agricultural economies,” with export-oriented supply chains that are reliant on high-value markets in developed countries and production systems that are divorced from local consumption. Exports of high-value food brought benefits to a number of developing countries at both the macro- and microeconomic levels, although concerns were raised about the distribution of these benefits along the supply chain (Watts and Goodman; Mingione and Pugliese; Gerefi, Korzeniewicz,

and Korzeniewicz). The performance of these systems, however, is dependent upon continued access to markets in developed countries and favorable international market conditions (Raynolds et al.). A key factor in this has been the liberalization of trade in agricultural and food products through the General Agreement on Tariffs and Trade (GATT) and, more recently, the World Trade Organization (WTO) (Henson et al.).

In recent years, considerable progress was made in lowering barriers to trade, such as tariffs and quantitative restrictions. In the case of agricultural and food products, the most recent Uruguay Round in particular resulted in commitments to liberalize trade (Hathaway and Ingco). Specifically, significant reductions in tariffs were achieved for tropical agricultural products (UNCTAD, 1998). As “traditional” restrictions on trade in agricultural and food products were liberalized, however, attention focused on technical measures such as food safety regulations, labeling requirements, and quality and compositional standards. On the one hand, this reflects the global proliferation of technical measures, particularly in developed countries (Henson et al.). On the other hand, it reflects wider recognition that technical measures can act, either explicitly or implicitly, as a barrier to trade in a similar manner to tariffs and quantitative restrictions (Laird and Yeats, Vogel, Sykes, Messerlin and Zarrouk).

It is widely acknowledged that sanitary and phytosanitary (SPS) measures can act

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to impede trade in agricultural and food products (Petrey and Johnson; Ndayisenga and Kinsey; Thilmany and Barrett; Hillman; Sykes; National Research Council; Unnevehr; Jaffe; Digges, Gordon, and Marter). In certain cases, stricter SPS measures are applied to imports than to domestic supplies, for example, where higher risks are associated with supplies from other countries. However, even where comparable SPS measures are applied to both imported and domestic products, they can act to impede trade by, for example, imposing higher costs of compliance on importers than on domestic suppliers.

To date, the trade impacts of SPS measures have been most widely acknowledged in a developed country context. However, it is becoming more widely recognized that SPS measures are a particularly important issue for developing country exports (see, for example, UNCTAD 1997, 1998, Singh, FAO, UNCTAD and Commonwealth Secretariat, Zarrilli, Finger and Schuler, Hirschorn and Unnevehr). This reflects the predominance of agricultural and food products in developing country exports and the technical capability of developing countries to comply with SPS requirements. Indeed, evidence suggests that the costs of compliance with SPS requirements that developing countries face when accessing developed country markets can be very high, in certain cases prohibitively so. For example, the cost of upgrading sanitary conditions in the Bangladesh frozen shrimp industry to satisfy European Union (EU) and U.S. hygiene requirements is estimated to have been \$17.6 million over the period 1997–8 (Cato, Cato and Lima dos Santos). The cost of maintaining a hazard analysis and critical control point (HACCP) program in each of these facilities is estimated to be \$225,000 per annum. Similarly, the estimated cost of achieving disease- and pest-free status to enable Argentina to export meat, fruit, and vegetables to the EU, United States, and other developed country markets is estimated to have been \$82.7 million over the period 1991–6 (Finger and Schuler). These costs can be prohibitive for small producers and processors which, as a consequence, can be excluded from the export supply chain.

This paper explores the impact of food safety regulations on developing country exports of agricultural and food products through a case study of fish exports from Kenya to the European Union (EU). It explores the restrictions on exports that

Kenya has faced since 1996 and the impact that these have had on participants in the export supply chain. Finally, the implications for the future development of Kenyan fish exports are assessed.

### **Fish Exports from Kenya to the European Union**

Although fish only accounted for 3% of exports by value in 1996, the volume of exports increased 117% over the period 1989–96 as a result of fertile markets in developed countries such as the EU. Furthermore, along with horticultural products, fish have been recognized as having great potential as an export-oriented sector. The main export product is Nile Perch (*Lates niloticus*), which accounted for 88% of exports by volume in 1996, predominantly from Lake Victoria. Nile Perch are exported both fresh and frozen, the former almost entirely to the EU. Overall, the EU accounted for 59% of exports by volume in 1996.

### **Development of the Export Supply Chain for Nile Perch from Lake Victoria**

Until the mid-1970s, fish stocks in Lake Victoria were exploited solely by small-scale fisherfolk, most of whom derived their income solely from fishing.<sup>1</sup> The rapid expansion of Nile Perch fisheries in the Kenyan part of the lake started at the end of the 1970s. In 1978, about 1000 tons of Nile Perch were caught, rising to 50,000 tons in 1985, and reaching a peak of 123,000 tons in 1991 (Othina and Osewe-Odera, Geheb, Geheb and Binns).<sup>2</sup> As a result, the number of fisherfolk increased from around 11,000 in 1971 to 22,000 in 1989 and 30,000 in 1995 (Fisheries Department 1995). The number of fishing boats also increased significantly, reaching 8000 in 1995, and there was significant investment in fishing nets and other equipment designed to catch the large Nile Perch demanded by industrial fish processors (Reynolds, Greboval, and Mannini; Ogutu 1992; 1994; Abila and Jansen). Much of the

<sup>1</sup> During this time it is estimated that, across Lake Victoria as a whole, around 50,000 fisherfolk operated from about 12,000 boats, with an annual catch of 100,000 tons (Butcher and Colaris).

<sup>2</sup> Since 1991, total production declined due to problems with overfishing and the proliferation of Water Hyacinth.

expansion has, however, been through investment by absentee fisherfolk, with boats operated by a crew employed on a daily basis as and when fish can be caught and there is sufficient market demand (Jansen).

Despite the expansion of the Lake Victoria fisheries, with the exception of a small number of trawlers that operate illegally, fishing is still undertaken from wooden boats with a crew of between two and four fisherfolk. Relatively few of the boats are motorized and the main technological advance has been in the type and the size of the net. Facilities on landing beaches remain rudimentary and are often restricted to a covered area where fish are sold and in some cases a landing jetty. There is rarely a source of potable running water, toilets, chilled storage facilities, or fencing to prevent entry of rodents and domesticated animals to the landing area.

Traditionally, the trading and processing sectors were dominated by small-scale operators, most of them women, who were based in the local communities around the lake (Abila and Jansen). Fish that were not eaten fresh were subdried or smoked on the beach and transported to inland markets. Given that the bulk of the fish were traded locally, the role of wholesalers was minimal and traders had little or no market power over local fisherfolk (Jansen, Mitullah 1998a). However, mirroring the expansion of the Lake Victoria fisheries and the growth in export demand since the early 1980s, the structure of the fish processing sector has changed dramatically. The first industrial fish processing facilities were established in Kenya in the mid-1980s, aimed predominantly at export markets for fresh and frozen Nile Perch fillets. By 1996, a total of fifteen processing factories were operating around Lake Victoria or in Nairobi, from which fresh fillets were air freighted to the EU (Fisheries Department 2000). Many received financial assistance from international development banks and support from government aid agencies in developed countries (Jansen). Most, however, have never operated at full capacity and have been forced to accept smaller fish than is ideal for processing because of the decline in the volume of fish caught in Lake Victoria (Abila and Jansen).

The development of industrial fish processing has had effects on local fish processing activities. Competition for Nile Perch from industrial processing plants led to the demise of most local fishmongers and processors.

This activity previously employed thousands of people in the fishing communities around Lake Victoria, the vast majority of whom were women (Jansen). Further, as a result alternative local markets for Nile Perch have largely disappeared. However, a new sub-sector developed around the factories, processing skeletons and other fish waste. For example, in the Obunga area of Kisumu, over 500 women are employed frying skeletons, which are packaged and transported for sale throughout Kenya and neighboring countries (O'Riordan).

As a result of the changes detailed above there has been a shift in the structure and modus operandi of the supply chain for Nile Perch in Kenya. In particular, traders now play a fundamental role in the link between fisherfolk and industrial processors, such that they have significant power to dictate supply terms, in particular price. Traders are generally tied, formally or informally, to particular processors. Traders sort the fish and select according to size and freshness. Rejected fish are sold locally at a significantly lower price. These modes of distribution, depicted by channels 1 and 2 in figure 1, now account for over 90% of all Nile Perch marketed in Kenya (Mitullah 1998a, 1998b). Traditional channels, depicted by channels 3 to 5 in figure 1, play a secondary role and in some locations disappeared altogether, making fisherfolk all the more dependent on traders.

The progressive export-orientation of the Nile Perch supply chain has had profound effects on the livelihoods of local people. It is estimated that during the 1980s, an additional 180,000 were employed in the harvesting, processing, and distribution subsectors of the Nile Perch supply chain. Further, incomes in local fishing communities increased to levels that had not previously been experienced (Reynolds and Greboval, Abila and Jensen), although more recently as catches have declined, fisherfolk have had to explore alternative sources of livelihood such as agriculture (Geheb and Binns). Overall, it is estimated that 500,000 people relied, directly or indirectly, on the Lake Victoria fisheries sector in 1995 (Jansen, Abila and Jansen, Mitullah 1998a). Simultaneously, however, certain traditional livelihoods, for example, small-scale fish processing, disappeared while many of the beneficiaries, for example, employees in the predominantly urban-based fish processing plants, are not part of local

Channel 1	Channel 2	Channel 3	Channel 4	Channel 5
Fisherfolk	Fisherfolk	Fisherfolk	Fisherfolk	Fisherfolk
Traders	Traders	Fishmongers	Traders	Small-Scale Processors
Refrigerated Trucks	Refrigerated Trucks		Bicycle/Bus/Foot	Traders
Industrial Processors	Industrial Processors		Municipal Markets	Bicycle/Bus/Foot
Export Markets: <i>Fresh/Frozen Fillets</i>	Domestic Retailer: <i>Frozen Fillets</i>	Local Markets: <i>Fresh Fish</i>	Domestic Retailer/Market: <i>Fresh Fish</i>	Domestic Markets: <i>Dried Fish</i>

**Figure 1. Marketing channels for fish from Lake Victoria**

fishing communities. Furthermore, the sector as a whole has become highly dependent on exports, particularly to the EU. On the one hand, the demand for Nile Perch domestically remains limited. On the other hand, the supply chain is oriented towards the production of high-value fillets, the costs of which cannot be recouped through sales at domestic prices.

### European Union's Food Safety Requirements for Imports of Fish

The EU lays down harmonized requirements for hygiene in the production and the marketing of fish and fish products.<sup>3</sup> These requirements cover the entire supply chain, including fishing boats, landing facilities, and processing plants. Broadly speaking, they are based on the principles of HACCP. Processing plants are inspected and are approved on an individual basis by a specified "competent authority" in the country of origin, whether an EU member state or a third country, to ensure they comply with these requirements. The European Commission undertakes checks to ensure that the competent authority undertakes this task in a satisfactory manner and, therefore, that the EU's hygiene requirements are satisfied.

Since January 1999, Third Countries have only been permitted to export to the EU if approved by the European Commission.<sup>4</sup> Before a third country receives approval, the European Commission assesses the capability

of that country's competent authority to certify that exporters operate by hygiene standards that are at least equivalent to those in the EU and establishes specific import requirements based on an assessment of food safety risks. Countries for which this has been undertaken are given List I status and can freely export to the EU from approved processing plants. It is evident, however, that many countries have faced problems meeting the EU's hygiene requirements and it has taken longer than anticipated for the European Commission to establish import requirements for individual third countries. Therefore, until December 2000, exports are permitted from countries given List II status which, although they do not fully comply with the EU's hygiene requirements, can certify that the hygiene conditions that are applied are at least equivalent to those in the EU. Imports from these countries are subject to more rigorous border inspection.

### Restrictions on Fish Exports from Kenya

Kenya experienced a number of problems gaining approval from the European Commission to export fish to the EU—it did not obtain List II status until January 1999. A number of other developing countries, including Kenya's neighbors Uganda and Tanzania, experienced similar problems. Since 1997, the Commission has undertaken a series of inspection visits to Kenya and has subsequently questioned the procedures by which plants are approved for export to the EU and export health certificates are issued for individual product consignments, as well as for overall standards of hygiene in the supply chain. An area of particular concern is

<sup>3</sup> Directive 91/493/EEC.

<sup>4</sup> Previous to that time, third countries that were not approved by the commission could export to individual member states, who were responsible for ensuring the product satisfied the EU's requirements.



hygiene standards on boats and at landing sites, many of which lack jetties, potable running water, cooling facilities, fencing, etc.

Since 1997, Kenya (along with Tanzania and Uganda) has been subject to two phases of restrictions on exports of fish, and in particular Nile Perch, to the EU. In part, these reflect underlying concerns within the European Commission about hygiene standards in the supply chain (see above), but also specific food safety problems in the region. These are summarized in table 1. The first phase started in April 1997, following border inspections indicating that consignments of Nile Perch were contaminated with *Salmonellae*. Subsequently, all consignments of Nile Perch were subject to border testing for *Salmonellae*, the cost of which was borne by the importer. In December 1997, these problems were confounded by an outbreak of cholera in East Africa, as a result of which the EU subjected consignments of fish to border testing for *Vibrio cholerae* and *Vibrio parahaemolyticus*.<sup>5</sup> Because of the time taken for these tests to be undertaken, exports of fresh fish were subsequently prohibited. These restrictions remained in place until June 1998.

The second phase of restrictions started in April 1999. This followed reports of fish being poisoned with pesticides in Lake Victoria, as a result of which Uganda voluntarily suspended exports to the EU in March 1999. Although Kenya (and Tanzania) adopted precautionary measures in an attempt to prevent contaminated fish from entering the supply chain, these measures were not deemed adequate by the European Commission, and a ban on exports of fish from Lake Victoria was implemented. The European Commission subsequently undertook an inspection visit to Kenya to assess the monitoring and residue-control program that the government established, but identified certain discrepancies that it required to be addressed before exports could be permitted.<sup>6</sup> The ban currently remains in place.

<sup>5</sup> These measures were subject to criticism in the WTO's SPS Committee, in particular through a statement tabled by the World Health Organization (WTO 1998).

<sup>6</sup> For example, there were concerns about the quality of sampling procedures and adequacy of laboratory facilities for residue testing.

## Impact of the Restrictions<sup>7</sup>

The aim of the remainder of the paper is to assess the impact of the EU's restrictions on overall exports of fish from Kenya and on the fish supply chain. In so doing, emphasis is placed on the manner in which the supply chain has evolved, as it has become progressively more export-oriented and reliant on trade with the EU. Due regard is given to the interrelationships between participants at different levels of the supply chain, and in particular to modes of dependency between them.

### *Response of the Kenyan Government*

The Kenyan Government has undertaken a number of initiatives to address the concerns of the European Commission in an attempt to have the restrictions suspended and ultimately to get full (List I) approval for the export of fish to the EU. This involved both legislative change and reform of procedures for the approval of plants for export to the EU and the issuing of health certificates. For example, the Kenya Bureau of Standards (KEBS) published a code of hygiene practice for the handling, processing, and storage of fish, which applies to all fish regardless of whether for export or for the domestic market. This standard essentially harmonizes Kenyan hygiene requirements for fish with those of the EU.

The Kenyan Government, however, faced considerable resource constraints that limited its ability to respond to the EU's concerns, particularly where modernization of basic infrastructure and facilities is required. For example, it is estimated that the cost of upgrading a single landing site on Lake Victoria to provide potable running water, cooling facilities, etc. is around \$1.2 million (Lake Victoria Management Project). Given that there are five main beaches that supply fish for export (Ministry of Health), the total cost is estimated to be \$5.8 million. The cost of upgrading laboratory facilities for chemical and microbiological analysis is estimated

<sup>7</sup> The assessment of the impact of the EU's restrictions on the Kenyan fish supply chain was undertaken over the period June 1999 to May 2000. It had three main elements: (1) collection and analysis of secondary data, for example, volume and value of exports, mainly from published Government sources; (2) interviews with Government personnel, nongovernmental organization and other key informants; and (3) interviews with fish processors, fisherfolk, and other members of fishing communities on Lake Victoria based on a semistructured interview guide.

**Table 1. Summary of Food Safety Restrictions on Fish Exports to the European Union**

Dates	Restrictions	Products
4 April 1997–30 June 1998	Border testing of all consignments for <i>Salmonella</i>	Nile Perch
23 December 1997–30 June 1998	Exports prohibited Border testing of all consignments for <i>Vibrio cholerae</i> and <i>Vibrio parahaemolyticus</i>	Fresh fish Frozen-processed fish not caught at sea and directly landed to EU
12 April 1999–	Exports prohibited	Fish from Lake Victoria

to be \$1.1 million (Lake Victoria Management Project). The Kenyan Government is currently in discussions with the European Commission regarding technical assistance to fund, at least in part, these improvements.

#### *Fish Exports from Kenya*

As highlighted above, the EU is a very important market for Kenyan exports of fish, accounting for 59% of exports by volume during the period immediately prior to the introduction of the restrictions. It is not surprising, therefore, that the EU's measures have had a significant impact on Kenyan fish exports. Figure 2 details monthly fish exports over the period January 1997 to December 1999. The impact on exports of the EU's restrictions is immediately apparent, particularly during the two periods in which exports of particular types of fish were prohibited.

During 1998, when exports of fresh fish were prohibited for a period of six months, the volume of exports was 29% lower than in 1996, while exports to the EU were 69% lower. Similarly, in 1999 total fish exports were 21% lower than in 1996, while exports to the EU were 64% lower. This indicates a significant trade diversion effect, whereby Kenyan exporters were able to partially offset the impact of the EU's restrictions by pursuing alternative markets, in particular Israel, Singapore, Japan, and the United Arab Emirates. Despite this, however, (in nominal terms) the total value of fish exports was significantly lower in 1998 (37%) and in 1999 (24%) than in 1996.

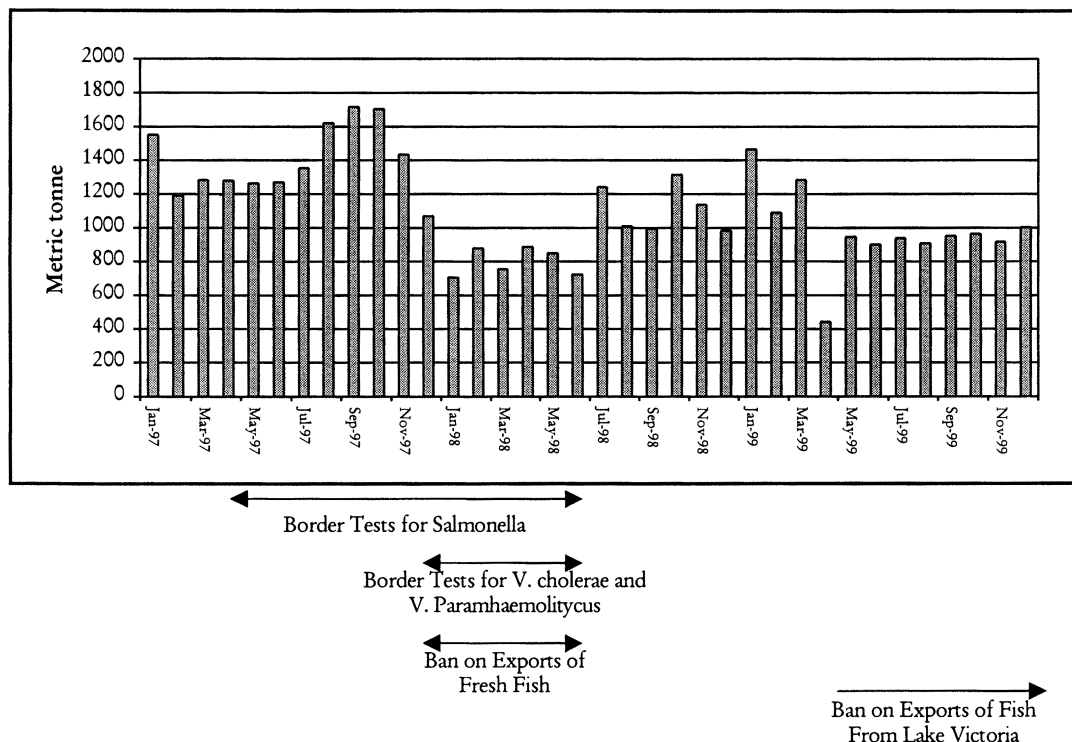
The EU's restrictions have had a particularly significant impact on exports of fresh fillets, for which the EU typically accounts for over 95% of exports and for which few alternative markets exist. In 1998 and 1999,

exports of fresh fillets were around 86% lower than in 1996. Conversely, in the case of frozen fillets, for which the EU accounted for 60% of exports in 1996, the decline in exports to the EU has been progressively offset by increased exports to other markets. Thus, in 1998, exports were 30% lower than in 1996, of which the EU accounted for 19%. In 1999, exports were 13% lower than in 1996, of which the EU accounted for 27%.

#### *Impact on the Fish Processing Sector*

The sector most immediately affected by the EU's restrictions on exports is fish processing. In recent years the fish processing sector was characterized by high levels of overcapacity and intense competition to obtain supplies of Nile Perch of sufficient size and quality for efficient processing and to meet customer requirements (Mitullah 1998b, 1999, Abila and Jansen). Traditionally there was little or no cooperation between fish processing companies, indeed they generally resisted sharing information and experiences for fear of losing competitive advantage (Mitullah 1999).

The EU's restrictions have had a significant impact on fish processors, both in terms of the economic performance of individual companies and the manner in which the sector as a whole is organized. First, the performance of fish processing companies has typically declined as a direct result of the loss of exports to the EU. Given that there are few alternative markets for fresh fillets, processors have had little alternative but to switch to production of frozen fillets, although market prices are typically 60% lower and have been further reduced by intensified competition among exporters. Many processors claim that during the periods that restrictions were applied, the returns from exports



Source: Central Bureau of Statistics (2000)

Figure 2. Exports of live, fresh, and frozen fish, 1997-9

of Nile Perch were barely sufficient to cover costs. Indeed, most have been operating at lower levels of capacity and have shed labor in an effort to minimize operating costs. Furthermore, four processing plants have subsequently suspended operations and two companies have gone into receivership. These companies typically had the lowest hygiene standards and/or lacked the necessary processing facilities to switch from production of fresh to frozen fillets.

Second, many processors have had to invest significant sums (at interest rates of over 20%) to upgrade their processing facilities and to improve their procedures so as to meet the EU's hygiene requirements. According to the Kenyan Government, only two plants that processed Nile Perch were in compliance with the EU's hygiene requirements in November 1998 (Ministry of Health). The improvements required to obtain approval for export to the EU, as identified by European Commission inspection visits and the competent authority, include upgrading of buildings and/or equipment, improvements to laboratory facilities, implementing HACCP plans, training of staff, etc. The necessary

investment undoubtedly contributed to the poor financial performance of many processing companies.

Third, the fish processing sector has also been forced to improve the manner in which it manages the supply chain for fresh fish. Traditionally, processors have been supplied through traders and, although some have provided finance and/or fishing equipment to fishing boats on the lake in an attempt to foster dependency among fisherfolk and to guarantee supplies, their role in the management of the supply chain has been limited. However, as a result of the EU's criticisms of hygiene conditions at landing sites, processors were forced to improve hygiene conditions not only in their own plants, but throughout the supply chain. A number of processors, for example, invested in cold storage facilities on the landing beaches and routinely provide ice for use by traders and for the transportation of fish to their factories. While this undoubtedly increased their power to dictate supply terms with fisherfolk, through the traders, it necessitated further investment at a time when competition is particularly intense.



Fourth, as a result of the EU's restrictions and demands for improvements in hygiene conditions throughout the fish supply chain in Kenya, the processing sector recognized the need to share information and to cooperate in relations with the Kenyan Government and the European Commission. Consequently, in 1998 the Kenya Association of Fish Exporters and Processors was formed, involving all of the main fish processing companies. Members of the association were prominent in negotiations with the European Commission, and indeed accompanied Kenyan Government officials to meetings in Brussels. It is conceded by many processors that the sector benefited as a result of this heightened level of cooperation, not only in dealing with the EU's restrictions, but in the longer term management of the sector. It is believed that this would have been unlikely if normal market conditions had prevailed.

Finally, the closure and/or reduction in output of industrial fish processing plants has, in turn, led to a decline in the supply of skeletons and other waste products. This has had significant consequences for those individuals, mainly women, who have built up a livelihood around the processing of these products. In Obunga, one of the largest communities dependent on the processing of waste products from fish processing plants, a women's group responded to this threat to their livelihood by collectively assuming the impact. The group, which organizes the processing activities of 800 women, rations the supply of skeletons available to each of its members. This meant that during 1999, each woman was typically allocated less than 50% of the skeletons that she processed previous to the introduction of the restrictions.

#### *Impact on Fishing Communities*

While there have been benefits to fishing communities from the progressive export-orientation of the supply chain, concerns have been expressed about the extent to which these communities have become dependent on the major fish processors and, in turn, export demand (Jansen, Abila and Jansen). In many cases, alternative markets, for example, local sales and small-scale processing, were driven out as the fish processors competed to secure supplies from a dwindling catch of Nile Perch. Furthermore, these communities typically have few alternative economic activities. It is therefore inevitable that

the loss of Kenya's main export market has had a deleterious effect on those who are directly or indirectly associated with the Lake Victoria fisheries.

The most immediate and significant impact of the restrictions was a decline in the landed price of Nile Perch, reflecting reductions in demand from the major fish processors as total exports diminished and the lower price associated with exports of frozen fillets. In 1998, the average landed price of Nile Perch was 33% lower than in 1996. While the average landed price was higher in 1999 than in 1998, at least in nominal terms, it was 18% lower than in 1996. The impact on the livelihood of fisherfolk around Lake Victoria reflects the availability of alternative economic activities. While in some areas fisherfolk also undertake agricultural production, in others there is little or no land available for cultivation and the sole source of income is fishing (Geheb and Binns). Even in an area where there are opportunities for agricultural production, however, fishing remains an important source of income and any reduction in the landed price of Nile Perch has a significant impact on livelihoods (Osienala).<sup>8</sup>

Concern has been expressed about the impact of the export-orientation of the Lake Victoria fisheries on local food security. While it is not possible to quantify the impact of export demand on local fish consumption, many observers highlight the fact that the normal price of whole fish is beyond the reach of most people in fishing communities (Jansen). It might be expected, therefore, that the decline in the landed price of Nile Perch had a positive impact on fish consumption. However, even though the availability of Nile Perch increased during the periods when exports were restricted, prices still remained beyond the reach of local people. Indeed, surplus fish were frequently transported to urban markets such as Nairobi and Mombasa, where consumption among middle-income consumers increased.

Changes in the organization and the operation of the fish supply chain that have been brought about by the EU's restrictions on exports undoubtedly have longer term implications for local fishing communities. Particularly relevant is the more direct control of the procurement of fish from landing beaches

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<sup>8</sup> Survey work is currently being undertaken to assess the impact of restrictions on exports to the EU and livelihoods around Lake Victoria.

by fish processors and investment in infrastructure such as cooling facilities and sanitation. While these changes may help to secure longer term access to the EU market, they are likely to enhance the dependency of fisherfolk on the industrial fish processors, both directly and via traders, and to diminish further their ability to negotiate the terms on which they trade.

## Conclusions

This paper has explored the impact of hygiene requirements on fish exports from Kenya to the EU as an illustration of the impact that food safety measures in developed countries can have on export-oriented supply chains in developed countries. It demonstrates how the economic effects of restrictions on exports, which might relate to quite genuine food safety concerns, can be considerable and are manifest at both the macro- and microeconomic levels. These effects are most pronounced in export-oriented sectors that are highly dependent on particular developed country markets and for which the potential for trade diversion is limited.

In the case of fish exports from Kenya to the EU, a supply chain that is highly reliant on the EU market for fresh fillets, the economic impact of prolonged prohibitions on exports has been significant. At the macroeconomic level, fish exports declined, with consequent reductions in foreign exchange earnings. At the microeconomic level, industrial fish processing companies closed and/or reduced capacity and employment in the sector declined. Furthermore, the livelihoods of fisherfolk and others in local fishing communities, who have limited access to alternative economic activities, in part as a result of the progressive export-orientation of the sector, have suffered as market prices for fish have declined.

The paper highlights the great importance of market access if developing countries are to successfully exploit opportunities for high-value food exports to developed countries. Although traditional barriers to trade such as tariffs and quantitative restrictions are at least partially liberalized and many developing countries are subject to preferential trading arrangements, other measures such as food safety requirements can equally act as barriers to trade. Indeed, food

safety and other technical requirements can impose a heavy burden on developing countries, reflecting the resource constraints that constrain their ability to comply. For export-oriented supply chains with limited alternative markets this is a particularly salient issue.

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