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BANS, TESTS AND ALCHEMY: FOOD SAFETY STANDARDS AND THE UGANDAN FISH EXPORT INDUSTRY

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Contents

Abstract

Fish exports are the second largest foreign exchange earner in Uganda. When Uganda's fish export industry started to operate in the late 1980s and early 1990s, one may have thought that fish was being turned into gold. From an export value of just over one million US$ in 1990, the mighty Nile Perch had earned the country over 45 million US$ just six years later. But alchemy proved to be more than the quest of the philosophers' stone to change base metals into gold. From 1997 to 2000, the industry experienced a series of import bans, imposed by the EU on grounds of food safety. Despite claims to the contrary, the EU did not provide scientific proof that fish was actually 'unsafe'. Rather, the poor performance of Uganda's regulatory and monitoring system was used as a justification. The 'system', as the characters of an allegory, has no individual personality and is the embodiment of the moral qualities that 'the consumer' expects from 'responsible operators' in the fish sector. Only by fixing this system of regulations and inspections, and by performing the ritual of laboratory testing did the Ugandan industry regain its status as a 'safe' source of fish. Fish exports now earn almost 90 million US$ to the country. This apparent success story was achieved by a common front comprising government authorities and the processing industry, a high level of private-public collaboration not often seen in East Africa. Yet, important chunks of the regulatory and monitoring system exist only on paper. Furthermore, the system is supposed to achieve a series of contradictory objectives: to facilitate efficient logistics *and* ensure food safety; to match market demand *and* take care of sustainability; to implement a top-down food safety monitoring system *and* a bottom-up fisheries co-management system. This means that at least some food safety-related operations have to be carried out as 'rituals of verification'. Given the importance of microbiological tests and laboratories in the food safety compliance system, alchemic rituals are perhaps a more appropriate metaphor. While the white coats and advanced machinery of present-day alchemists reassure insecure European regulators and consumers, it leaves the Ugandan fish industry in a vulnerable position. In Uganda, fish can now be turned into gold again – but for how long?

> **alchemy**, ancient art of obscure origin that sought to transform base metals (e.g., lead) into silver and gold; forerunner of the science of chemistry … Alexandria is generally considered a center of early alchemy, and the art was influenced by the philosophy of the Hellenistic Greeks; the conversion of base metals into gold (considered the most perfect of metals) was part of a general striving of all things toward perfection. Since the early alchemists were mainly artisans, they tried to conceal the secrets of their work; thus, many of the materials they used were referred to by obscure or astrological names. It is believed that the concept of the philosopher's stone (called also by many other names, including the elixir and the grand magistery) may have originated in Alexandria; this was an imaginary substance thought to be capable of transmuting the less noble metals into gold and also of restoring youth to the aged.
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> *The Columbia Electronic Encyclopedia*, 6th ed., 2005, Columbia University Press.

> Alchemy is a complex subject with many different interconnected aspects. Many people still only think of the quest of the philosophers' stone to change base metals into gold … [Some] alchemical texts are wonderful works of allegorical literature, delve into its amazing, beautiful and enigmatic symbolism, and ponder its underlying hermetic philosophy, which holds a picture of the interconnection of the Macrocosm and Microcosm.
>
> http://www.levity.com/alchemy/home.html

1. Introduction[1]

When Uganda's fish export industry started to operate in the late 1980s and early 1990s, one may have thought that fish was being turned into gold. From an export value of just over one million US$ in 1990, the mighty Nile Perch had earned the country over 45 million US$ just six years later. But alchemy proved to be more than the quest of the philosophers' stone to change base metals into gold. From 1997 to 2000, the industry experienced EU import bans that were justified on the basis of allegorical meanings to the notion of 'fish safety'. All of a sudden, the 'Macrocosm' of consumer protection and the 'Microcosm' of fishers and fish processing plant workers' practices and lives became strongly interconnected. Despite claims to the contrary, the EU did not provide scientific proof that fish was actually 'unsafe'. Rather, the poor performance of Uganda's regulatory and monitoring 'system' was used as a justification. The 'system', as the

[1] I am indebted to Martin Fowler, Michael Friis Jensen, Peter Gibbon, and Jesper Raakjær Nielsen for useful comments on earlier versions of this paper. All mistakes and omissions are fully my own responsibility. The fieldwork upon which this paper is based was funded by the Danish Social Science Research Council. While in Uganda, I was affiliated at the Economic Policy Research Centre, Makerere University campus, Kampala. I am grateful to both institutions for their support. In order to maintain confidentiality, the identity of persons and companies covered during fieldwork has been concealed. References to interviews are therefore coded (e.g. UGF01) in the text and so are the identities of companies in various tables and figures (identified by A, B, C etc).

characters of an allegory, has no individual personality and is the embodiment of the moral qualities that 'the consumer' expects from 'responsible operators' in the fish sector.

Only by fixing 'the system' (of regulations and inspections) and performing the ritual of laboratory testing for all consignments for exports to the EU did the Ugandan industry regain its status as a 'safe' source of fish. This was achieved by a common front comprising the 'competent authority' (the Department of Fisheries Resources) and the processing industry, a high level of private-public collaboration not often seen in East Africa. A now 'well-functioning' system should be enough to minimize the risk of food safety failure, but product testing is still carried out anyway – just in case. Yet, important chunks of 'system' exist only on paper. The white coat and advanced machinery of present-day alchemists reassure insecure European regulators and consumers. In Uganda, fish can be turned into gold again – but for how long?

This paper is part of a series of studies examining the symbolic and concrete impacts of Northern countries' food safety, quality management and sustainability standards on African fisheries. These studies are carried out in the context of two research activities: (1) a research project focusing, among other sectors, on the fish export industries in Uganda (Nile perch) and South Africa (hake), funded by the Danish Social Science Research Council; and (2) a research programme ('Standards and Agro-Food Exports', SAFE) carried out by a team of researchers at the Danish Institute for International Studies (DIIS), Copenhagen and the Department of Agricultural Economics and Agri-business at Sokoine University of Agriculture, Tanzania. This programme, funded by the Danish Council for Development Research, has both research and capacity building components and covers the value chains for fishery products, spices, organic produce, and cut flowers from Tanzania and selected comparative countries (Uganda, Kenya, India, Vietnam) to Northern countries.[2]

[2] Both of these activities build upon a previous research programme (Globalisation and Economic Restructuring in Africa, GLAF) also based at DIIS (previous to 2003, Centre for Development Research). GLAF examined the changing role of Africa in the global economy through the lenses of Global Value Chain (GVC) analysis. It covered the value chains for coffee, cocoa, cotton, citrus, clothing, and fresh vegetables originating from a number of African countries (Tanzania, Kenya, Ethiopia, Uganda, Zimbabwe, South Africa, Mauritius, and Ghana) and ending in the US, EU and Japan. The main findings of the GLAF programme can be found in a monograph (Gibbon and Ponte 2005), an anthology (Fold and Larsen forthcoming) and related publications. Ponte and Gibbon (2005), in particular, highlight the role of standards in shaping the governance of GVCs and trace a theoretical framework for further

Due to the current cycle in these research activities, this paper offers a primarily empirical and descriptive analysis on the structure and transformation of the Nile perch export industry in Uganda in the context of tightening food safety standards for fishery (and other agro-food) imports into the EU.[3] This is done in relation to current debates on the sustainability of resource extraction from the lake, both in Uganda and on Lake Victoria as a whole. Covering this aspect is particularly important in that the competent authority in charge of compliance with food safety standards for export is also the same that regulates and monitors fishing efforts and the sustainability of the resource. In theory, there should be no inherent conflict between ensuring food safety and resource sustainability. In practice, the competent authority has worked very closely with processors to regain access to the EU market during the export bans of the late 1990s. Along the way, it has developed a much more open attitude towards the commercial interests of the industry. Therefore, 'private' standards (such as the size of fillets requested by European buyers, or the sheer volume of fish demand from the lake) indirectly 'filter' through the regulatory system. This filtering process takes place via direct industry pressure on regulators, but also via an indirect building of shared (commercial and political) interests between industry and regulators in view of maintaining the 'success' story of the fish sector in Uganda, at least in the short term.

In practice, this means that the regulatory authority in Uganda seeks to match objectives that are often in contrast with each other. First, it needs to facilitate efficient logistics *and* food safety. This means that the results of some product tests are available only after a shipment has been sent to Europe; a recall system is in place, but commercial realities suggest that possible problems are solved contractually among the parts, rather than by the EU authorities seizing consignments. Second, the authority is asked to facilitate the matching of market demand (maximization of

work on the subject. The new SAFE programme builds upon those premises and is presently at the early stages of empirical work.

[3] This paper should be read in relation to: (1) an article on the role of subsidies, tariff and non-tariff barriers in shaping market access to the EU for African fisheries products (Ponte, Nielsen and Campling 2005); and (2) an article on the transformation process in the South African fishery sector (Crosoer, van Sittert and Ponte 2005) that also discusses the role of sustainability standards (the Maritime Stewardship Council label) as a tool for political influence in domestic debates on fishery resource management. In the short term, it will be followed by a similar in-depth study of standards in the South African hake industry and by a more theoretical analysis of the contradictions that market demands, food safety standards and natural resource management place on local regulatory agencies and fishery sector operators in Uganda and South Africa.

volume, small fillet sizes) *and* to preserve the resource ('sustainable' extraction, ban on trading small fish), all in an environment of very limited information on stocks and eco-system dynamics. Third, it is expected to operate in a hands-on fashion in terms of food safety monitoring (product tests for all export consignments, a comprehensive schedule of inspections) *and* to move towards hands-off fisheries management (establishment of Beach Management Units at the local level, using a co-management approach to fisheries).

These schizophrenic exercises and compliance systems mean that at least some food safety-related operations are by necessity carried out as 'rituals of verification', as Power (1997) would have it. Given the importance of microbiological tests and laboratories in the food safety compliance system, alchemic rituals are perhaps a more appropriate metaphor. This is unlikely to be a peculiar trait of Uganda's food safety compliance system, or of African countries' more generally. If comments collected by the author from Uganda- and South Africa-based fish industry operators are anything to go by, European systems may fall in the same mould. However, more research is needed to verify the applicability of the 'alchemic rituals' argument outside the case study presented here.

The contradictions highlighted here suggest that an analysis of how food safety standards shape the fish value chain in Uganda should be done in a comprehensive way. In this paper, this is done in relation to: (1) the international regulatory framework governing exports of fish from Lake Victoria – placing the importance of food safety standards in the context of tariff barriers and international agreements that affect fish trade (see Section 2); (2) the dynamics of production, trade and regulation of Ugandan fisheries on Lake Victoria – in specific relation to stocks, catch efforts, fishery resource management, aquaculture, and the characteristics of international and regional fish trade (see Section 3); and (3) how the Ugandan Nile perch value works in practice – contractual relations, kinds of actors and operations from catch to export, and distribution of value added (see Section 4).

Those readers who prefer a narrower approach to understanding how the EU import bans impacted on the Ugandan fish industry should turn directly to Section 5 (and following) of this paper. These bans were based on the application of EU food safety standards (see Appendix 1 for an up-to-date picture of requirements) and resulted in a major upgrading of processing plants and of regulatory and monitoring systems in the country. Section 6 highlights other standards that the industry has matched (ISO 9001:2000) or that may become relevant in the future (Maritime Stewardship Council certification on 'sustainable fisheries'). Section 7 briefly reviews the problems that LDCs like Uganda face in participating in standard setting and revision. Section

8 provides some preliminary conclusions and discusses the contradictions faced by regulators and industry operators.

2. The international regulatory framework governing exports of fish from Lake Victoria

2.1 MAIN AGREEMENTS AND TARIFF BARRIERS

Trade in fish and fishery products (hereafter 'fish') has grown strongly during the past 25 years. Export values for these products has increased by approximately 600% during this period, reaching US$58.2 billion in 2002 (FAO 2004). For many developing countries, fish exports have become an important source of foreign exchange earnings. At present, they represent the most important item in terms of net export value in developing countries – exceeding the combined export revenues derived from key agricultural products such as coffee, tea, rubber, rice, meat and bananas (FAO 2004).

The export value of fish from Africa has doubled during the last decade to US$3.2 billion. The top African exporters are all countries with major marine catches, although some of them (e.g. Tanzania and Uganda) have large inland fisheries. Fish exports provide substantial proportions of total export values in several African countries. In 2003, these were as high as 38% in Seychelles, 28% in Mauritania, 20% in Namibia, and 17% in Uganda.

Fish trade is regulated via a complex overlap of multilateral and bilateral agreements (see details in Ponte, Nielsen and Campling 2005). At the WTO level, during the Uruguay Round, fisheries were left out of the Agreement on Agriculture at the insistence of some EU countries (France, Spain, and Italy). As a result, fisheries-related issues are covered by various other agreements. Most notably, fisheries subsidies fall under the discipline of the Agreement on Subsidies and Countervailing Measures (ASCM). The main areas up for negotiation in the Doha round are tariff and non-tariff barrier reductions under the negotiating group on 'Non-Agricultural Market Access' (NAMA) – although very little movement has taken place on non-tariff barriers – and reduction of fisheries subsidies under the 'Group on Rules'.

As for the EU, the Cotonou Agreement applies to all African members that are part of the ACP group of countries. This agreement provides tariff-free access to the EU provided that fish ex-

ports comply with specific Rules of Origin (ROOs). For the time being, African ACP exports to the EU that qualify under Cotonou still have some degree of tariff preference. The EU is seeking to replace the Cotonou Agreement with a series of Economic Partnership Agreements (EPAs), but the negotiation process in this realm has been very slow. The outcome of these negotiations is particularly important for ACP countries that are not LDCs. If they fail to reach such agreements, from 2008 their tariff preferences may disappear. The Everything-but-Arms (EBA) scheme is a unilateral offer of the EU to all LDCs that is valid for an unspecified length of time. This also means that it can be withdrawn at any time. It allows tariff-free access to the EU, provided that they fulfil the appropriate ROOs. This offer applies to Tanzania and Uganda, but not to Kenya (which is not an LDC).

In relation to US-Africa trade relations, the main relevant agreement is AGOA, which currently covers 37 African countries. AGOA was renewed for the second time (thus, it is presently referred to as AGOA III or 'AGOA Acceleration Act') in July 2004. It is supposed to remain in place at least until 2015. In other to qualify for exports to the US under AGOA, African countries need to meet specific eligibility requirements. The ROOs for fisheries products in AGOA are not so important in relation to fresh fish and fillet exports, as the Most-Favoured-Nation (MFN) tariff rate in the US is zero already in many of these categories. In other words, African countries do not need AGOA to export fishery products with low processing content to the US tariff free. This issue is more relevant for products with higher processing content (such as fish fingers, fish burgers, marinated fillets, etc.), which face higher MFN rates but can be imported tariff free into the US under AGOA.

2.2 NON-TARIFF BARRIERS

The discussion of non-tariff barriers faced by the three riparian countries on Lake Victoria is particularly important in view of two observations: (1) that tariff barriers do not seem to be the main determinant for gaining access to Northern markets for fish, especially for less processed products (fresh fish, fillets) that constitute the current portfolio of exports from Kenya, Tanzania and Uganda and – although tariff escalation does provide disincentives against local industries from producing higher-processed fish products; and (2) that even if fisheries subsidies are dramatically reduced in OECD countries, there would be no impact on African inland fisheries.

More relevant than tariffs and subsidies is the fact that the three East African countries have to face tough food safety standards to gain access to developed country markets. This issue is particularly tricky in relation to fisheries exports given their susceptibility to spoilage and the need for a cold-chain for many types of products. Much of the discussion in the burgeoning literature

on the impact of food safety standards on developing countries focuses on assessing compliance costs and on determining the thin boundary between 'legitimate' measures taken to safeguard consumers' health and the environment, and measures that are taken with that explicit intent, but that willingly or unwillingly protect developed-country industry operators (see, among others, Wilson and Abiola 2003; Henson and Mitullah 2004; Mehta and George 2005; World Bank 2005).

The main legal framework regulating food safety measures at the multilateral level is the WTO SPS Agreement, which aims at ensuring that SPS measures do not place 'unnecessary barriers to trade'. In essence, the agreement recognizes the right for countries to protect human, animal and plant life / health through the application of standards, provided that they are based on sound science, that they are appropriate to the levels of risk incurred, and that they do not unjustifiably discriminate among different importing countries. Complaints against a country's perceived discriminatory SPS measures can be brought to the Dispute Settlement Body (DSB) of the WTO. A formal application for the establishment of a dispute panel is not the only option, however. Complaints and requests for clarification can also be brought to the SPS Committee for discussion and possible bilateral informal settlement. In a review of SPS cases, Jensen (2002) shows that there are many more instances of discussions at the SPS Committee than cases eventually brought to the DSB. Covering the period from 1995 to mid-2001, he lists 118 discussions at the SPS Committee, and only 18 cases brought to the DSB. African countries acted as complainants in only 4 cases in the SPS Committee. In two of these, it was South Africa acting as a complainant. African countries brought no cases at all at the DSB level. This raises the obvious questions of African countries' human and financial capacity, and political will, in ensuring that the SPS Agreement is applied in ways that promote their interests.

The TBT Agreement is also relevant to fisheries. It aims at ensuring that standards, regulations and analytical procedures for assessing conformity do not create unnecessary barriers to trade. The TBT Agreement distinguishes between technical regulations (legally-binding laws issued by governments; e.g. use of a specific fishing technique) and standards (voluntary and market-based measures; e.g. ecolabels), although in reality there is a high degree of overlap between the two. In this realm, the main case that has been brought to the DSB so far has been the 'sardine case'. In this case, Peru complained against EU labelling regulations on canned sardines requiring the indication of geographic origin to qualify the term 'sardine' when it was not of the species *Sardinella pilchardus*. The case was ruled in favour of Peru by the dispute settlement panel.

In general, East African countries (and African countries more generally) at the moment do not seem to be inclined or able to use the WTO to address perceived discriminatory standards

applied in developed countries. But even when these measures may not be considered discriminatory or excessive, African fishery industries still face the task of compliance. The problems faced by these countries are not only the level of expenditure, paperwork and skills necessary for exporters to assure compliance, but also the legal, personnel and financial requirements placed on their governments to establish regulatory frameworks at the domestic level to support compliance.

The EU has in place particularly challenging regulations in this respect. The basic framework for fisheries products was laid out in the EC Directive 91/493 of 1991. This directive deals with 'the production and placing on the market of fishery products for human consumption'. It requires member states and third countries to put in place systems of inspection and control to ensure the safety of fisheries products, including the implementation of Good Hygiene Practices (GHPs) and Hazard Analysis and Critical Control Point (HACCP) systems. Other important regulations affecting African exports of fisheries products are EU Regulation 466/2001 setting the maximum limits for heavy metals in a number of species of fish and shellfish, and EU Regulation 2065 / 2001 on labeling information of fishery and aquaculture products.[4] As a result of the 'sardine case' mentioned above, the EU had to change its rules and accept any of 18 different species of sardine to be labeled 'sardine' and not 'sardine-type'. Finally, the EU is developing a legal framework to regulate the development of ecolabels and voluntary certifications, and laying down guidelines for the monitoring of claims. Many of the fisheries-specific measures highlighted above have now been integrated within what is known as the new EU 'hygiene package' of regulations (see Appendix 1).

In addition to these regulatory measures, fish exporters are increasingly under pressure to match private quality standards set by buyers under the specifications of fish processors and supermarket chains in Europe and elsewhere. Specific eco-labels on fisheries are also emerging, such as the Maritime Stewardship Council (MSC) certification on 'sustainable fisheries'. If they gain more prominence in the market, these initiatives may place additional market access hurdles on fish exports from LDCs.

In the rest of this paper, I will examine the repercussions of these increasingly complex demands on the Nile perch industry in Uganda. A similar case study will be carried out on Tanzania by

[4] EU rules require the label to provide information on the trade name of the species, production methods (capture or aquaculture) and country of origin.

colleagues at Sokoine University of Agriculture. For an in-depth case study of the Kenyan Nile perch industry, see Henson and Mitullah (2004).

3. Uganda fisheries on Lake Victoria: a profile

3.1 BACKGROUND

Uganda's open water bodies cover about 45,313 km^2 out of a total surface area of 241,551 km^2 (UBoS 2003). Its major lakes are Victoria, Kyoga and Albert. Lake Victoria is shared by Kenya (6% by area), Tanzania (51%) and Uganda (43%). It has a mean depth of 40 m, maximum depth of 84 m and a catchment area of 193,000 km^2. Lake Victoria is estimated to contribute about half of the national fish catch in Uganda. Catches on Lake Kyoga, Victoria and Albert cumulatively consist of 95% of the national catch**.** The major commercial species caught in these lakes are Nile perch (*Lates niloticus*), tilapia (*Oreochromis niloticus)* and 'mukene' *(Rastreneobola argentea).* The industry is regulated by the Department of Fisheries Resources (DFR), under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). Other relevant institutions, organisations and fisheries-related projects are listed and briefly described in Box 1.

Nile perch was introduced into Lake Victoria to feed on the previously abundant stock of small-sized 'nkeje' (*haplochromines cichlids*). It can grow to over 50 Kg but the minimum legal size for catch is about 2 Kg (the equivalent weight of a 50-cm fish, which is the minimum required length for catch) (Nyombi and Bolwig 2004: 7). Average annual catch of all fish from all lakes in Uganda is estimated to be in the range of 220,000 tons. According to one source, in the 1990s and early 2000s, Nile perch catches have dominated Ugandan fisheries – representing 60% of total recorded catches. Other major species that are exploited commercially are mukene with 20% of the total and tilapia with 10%; other species account for the remaining 10% (Bahiigwa and Keizire 2003: 4). Another source shows a very different picture, with 44% of total catches by volume represented by tilapia, followed by 41% by Nile perch in 2002 (Nyombi and Bolwig 2004).

Box 1: Institutional framework of Uganda fisheries

Department of Fisheries Resources (DFR), under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)

- Regulatory agency
- Competent authority on application of EU food safety regulation on fish

Lake Victoria Fisheries Organisation (LVFO) (see LVFO 1999)

- intergovernmental organization
- members: Kenya, Tanzania and Uganda
- deals with common resource management on Lake Victoria for ensuring sustainable development and maintaining a healthy ecosystem

Fisheries Resources Research Institute (FIRRI), under the National Agricultural Research Organisation (NARO)

- research, much of it on socio-economic aspects of fisheries

Kajjansi Aquaculture Research and Development Centre

- research on aquaculture, mostly on production and biology

District Fisheries Officers (LFOs), under the Ministry of Local Government

- extension services

Beach Management Units (BMUs)

- community-based organizations with the purpose of co-managing fisheries resources with government

Uganda Fisheries and Fish Conservation Association (UFFCA)

- NGO established in 1993
- national collective of community-based fisheries-related organization
- aims at mobilizing and organizing fisher communities into community-based organizations and build their capacity to undertake natural resource management and development processes

Uganda Fish Processors and Exporters Association (UFPEA)

- industry association representing all fish processors in the country
- promotes Ugandan fish, provides information
- facilitates the provision of technical support services to members
- collaborates with government in developing policies and programmes in the sector
- coordinates activities in relation to quality assurance

Quality Assurance Managers Association

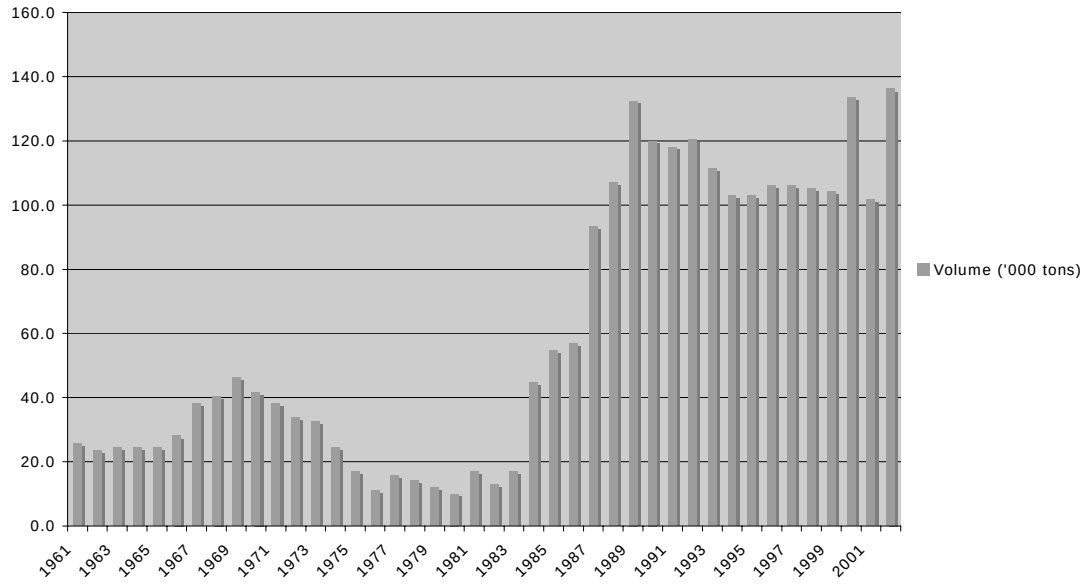
- association representing quality managers of fish processing plans
- started in 1997 as a result of the first EU ban
- tackles technical issues related to quality in the fish industry

Table 1: Estimated quantity of Lake Victoria fish landed in Uganda ('0

Year	Volume ('000 tons)	Year	Volume ('000 tons)
1961	25,5	1982	13,0
1962	23,4	1983	17,0
1963	24,4	1984	44,8
1964	24,4	1985	54,6
1965	24,4	1986	56,8
1966	28,0	1987	93,2
1967	38,2	1988	107,1
1968	40,5	1989	132,4
1969	46,3	1990	120,0
1970	41,7	1991	118,0
1971	38,1	1992	120,4
1972	33,9	1993	111,5
1973	32,5	1994	103,0
1974	24,5	1995	103,0
1975	16,9	1996	106,0
1976	11,1	1997	106,0
1977	15,7	1998	105,2
1978	14,2	1999	104,2
1979	12,0	2000	133,4
1980	10,0	2001	101,8
1981	17,0	2002	136,1

Source: Balirwa and Kamanyi (2004)

Figure 1: Estimated quantity of Lake Victoria fish landed in Uganda (1961-2002)



The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) estimates a Maximum Sustainable Yield (MSY) of 330,000 tons of all fish per year for all lakes in Uganda. This

translates in approximately 165,000 tons for Lake Victoria. Such a figure appears to be too high, as the largest recorded catch in the lake was 136,000 tons in 2002 (see Table 1; Figure 1). Total estimated catch for 2002 represents over five times the estimated catches of the early 1960s. These figures should be treated with caution, as they are little more than educated guesswork due to the large size of unreported fishing.

The general trend, however, seems to reasonably follow the development of the Nile perch export industry, which is said to have stimulated the growth of catch from the lake since its inception in the late 1980s. MAAIF recommends a maximum intake of Nile perch from Lake Victoria of 60,000 tons of Nile perch a year – yielding approximately 24,000 tons of fillets. This limit seems to have been reached in 2003 with exports of Nile perch fillets alone, without accounting for exports of headed and gutted fish and whole fish, and for local and regional trade (see Table 3). On the one hand, this may indicate that the resource is being already extracted at maximum sustainable capacity and perhaps even above this level. On the other hand, a top-down approach setting MSY and monitoring and 'controlling' access or effort may not be the most efficient way of managing the resource, especially given the relatively poor level of reliable information on biomass and fish population dynamics (see discussion on fisheries management in the next section).

3.2 FISHERIES RESOURCE MANAGEMENT

Nile perch was introduced into Lake Victoria from Lake Albert in the 1950s. Nile perch is a predator that feeds on other fish, and the idea behind its introduction in the lake was to 'convert' small haplochromine species into a more commercially exploitable fish (Graham 1929; quoted in Ogutu-Ohwayo 1999: 32).

During the 1940s and 1950s, the possible introduction of Nile perch into Lake Victoria was the subject of conflict between the Lake Victoria Fisheries Service (LVFS) and the East African Freshwater Fisheries Research Office (EAFFRO), with the former in favour of the introduction and the latter against it. Nile perch was first introduced into Lake Kyoga as an experiment that was supposed to inform the possible introduction of the species into Lake Victoria. However, Nile perch was clandestinely introduced into Lake Victoria from Lake Albert as early as 1954, despite fears that it would decimate the population of other species. Deliberate introductions followed in the late 1950s and early 1960s. Nile perch was first noted in fish catches in Uganda in 1964 (O'Riordan 1996: 40-41). Stocks of Nile perch started to increase rapidly from the early 1980s, followed by an increase in catches and the reduction/disappearance of many native species. Nile perch also started to feed on its own young, thus threatening its own sustainability (Ogutu-Ohwayo 1999).

The high rate of growth of fish exports in Uganda from the late-1980s has been accompanied by a number of concerns regarding the environmental sustainability of the resource base (ibid.: 11). These concerns relate to: (1) overfishing and resource depletion; (2) loss of biodiversity with the introduction of exotic species; (3) effluent pollution from fish processing and other industries; (4) degradation of shoreline ecosystems; and (5) resource mismanagement due to different environmental standards in the riparian states, which are now starting to be addressed through regional harmonization efforts.

Reliable historical records of total stock and sustainability of fishing efforts on Lake Victoria, and in the Ugandan section in particular, are not available. A sizeable amount of social science research has been carried out on the impact of export fisheries on the local economy, environment and communities under the auspices of two projects that have now terminated.[5] Yet, there is a dearth of reliable biomass and effort studies. A comprehensive stock assessment survey was conducted in 1969/71, when total mass in the three riparian countries was estimated at about 679,000 tons (Odongkara and Okaronon 1997), 248,000 tons of which were thought to be in Ugandan waters (Balirwa and Kamanyi 2004: 5). A comparison with sporadic surveys carried out between 1994 and 1997 suggests, however, that mean catch rates have decreased substantially (from 800 Kg/hour to 150 Kg/hour in the 4-29 m depth zone) and that there have been some major changes in the fish species composition in the lake: 83% of caught mass was haplochromine species in 1969/71; in 1994/97, 96.5% of total catch consisted of Nile perch (Odongkara and Okaronon 1997; for data on the mid-1980s, see Reynolds and Greboval 1988). More recent data on the period 1997-2000 suggest a relative restoration of haplochromine species (3.4%), with Nile perch still by far the predominant species (87%), followed by tilapia (9%) (Balirwa and Kamanyi 2004: 6). Fish biomass in 1999/2000 in the Ugandan waters of Lake Victoria was estimated to be 142,000 tons (ibid.: 7). If these figures mean anything, the biomass in 1999/2000 would be 57% of the level measured in 1969/71.

Lake Victoria, once a multi-species fishery, is currently dominated by only three species: Nile perch, tilapia and mukene. Tilapia appears to be more resilient than other species to Nile perch predation due to its rapid growth rate and relatively larger adult size. Mukene has an evasive schooling behaviour and undergoes vertical migrations that allow them to evade Nile perch predation (Ogutu-Ohwayo 1999: 35). The rate of regeneration of Nile perch in Lake Victoria is determined by the total number of eggs that hatch to fry (also depending on the number of

[5] The Lake Victoria Environmental Management Programme (LVEMP) and the Lake Victoria Fisheries Research Programmes (LVFRP).

mature females) and on the rate of fry that grow to enter the fishery to be harvested. Female Nile perch can lay 3-18 million eggs during the spawning period. Nile perch juveniles may take up to three years to be recruited into the fishery. The main reported factors affecting the regeneration of the fishery in Uganda include: cannibalism by Nile perch; water hyacinth affecting nursery, breeding and feeding grounds (now less of a factor than in the late 1990s due to the reduction of water hyacinth affected areas); destructive fishing methods (beach seines, cast nets); pollution (Odgonkara and Okaronon 1997); and catching of juvenile fish. There are fears that Nile perch may not sustain the high catch yields that have been realized since the late 1980s. There is also concern about the loss of species diversity due to predation by Nile perch. The challenge in managing fishery resources is thus to ensure the sustainability of Nile perch catches for export while controlling predation (Ogutu-Ohwayo 1999: 29).

Some authors have argued that resource management problems on Lake Victoria are compounded by the fact that it is an open-access body of water, thus not regulated by quotas. Although Uganda has tried to allocate processing-level quotas in the past, these have not actually been enforced. The initial quota allocation for processing plants was 135 tons/day (IADC 2002: Appendix 3.1). However, the current installed capacity Uganda is 530 tons/day (see Table 12). Even adjusting to actual utilization (200 tons/day), it is still much higher than the first quota allocation. Calls have been made for the allocation of Individual Transferable Quotas (ITQs) within the framework of setting a meaningful Maximum Sustainable Yield (Ogutu-Ohwayo 1999). Yet, these have not been taken up by DFR, probably as a result of the extremely fragmented industry structure at the catch level and the problems that this places on monitoring and implementation. However, some observers argue that ITQs could be allocated at the processing level. To be effective, they would need to be enforced in a harmonized manner by the three riparian countries.

The main regulations trying to address some of the apparently environmentally destructive practices in Uganda are: (1) prohibition on the use of beach seines (which drag the lake bottom and have low selectivity); and (2) a minimum 5-inch gill net mesh size (it releases Nile perch under 50 cm, which prey mostly on invertebrates and not believed to be harmful to other fish stocks). The latter regulation is linked to the 'Immature Fish Law'. Under this law, fishermen are not allowed to catch any Nile perch less than 50 cm long (CARANA 2002: 11).[6]

[6] Regionally, the focus of resource management systems in the three riparian countries on Lake Victoria is on: (1) implementation of rules on mesh size, with a view of increasing the minimum from 5 inches to 6-7 inches in the

The persistent use of illegal beach seines and small gill-nets (less than five inches) that catch immature fish are still seen as major factors causing fish stock reductions widely reported on Lakes Victoria, Albert and Kyoga (Odongkara and Okaronon, 1997; UGF01). Recently, the DFR regulation unit has embarked on cracking down on the use of monofilament nets, cast nets and seine nets (Nyombi and Bolwig 2004: 15). According to many industry operators, however, net size regulations are not enforced on the lake (see also Keizire 2004). Gill nets are in theory not allowed to be used within one kilometre from the shore, but this is not enforced either. On-water patrolling is almost non-existent.

In late 2003, MAAIF even suspended the application of the 'Immature Fish Law' under pressure from President Museveni. Exporters had convinced the president that Europeans have an appetite for small fish fillets, and that Kenya and Tanzania do not prohibit (or do not enforce) the catching and trading of immature fish. In apparent response to a 'public uproar' (by conservationists, MPs, and academics), the government retraced its steps and re-imposed the ban on immature fish two weeks later (*The New Vision*, 9 December 2003).

A survey of nine Ugandan processors (operating 15 plants and representing 95% of fish exports by value) carried out by the author suggests that the industry agrees on the necessity of having minimum size regulations. However, operators complain that regulation is not enforced adequately in the country, so they fear of being short-changed if they stick to it. Their major reservations relate to the nature of regional enforcement. According to a number of processors, when regulation is actually enforced more strictly in Uganda (as happened in 2003), all juvenile fish

medium term to protect juvenile Nile perch (Bwathondi, Ogutu-Ohwayo and Ogari 2002: 22); (2) implementation of size restriction for whole fish (possibly around the 45-100 cm slot); and (3) in the medium term, devising access restriction to the fishery through licensing of boats, fisheries or gears focusing on beach-level management (ibid.: 22). These joint activities are taking place within the framework of the Lake Victoria Fisheries Management Plan (LVFMP) (2003-07), which is implemented by the Lake Victoria Fisheries Organisation with funding from the EU. The plan focuses on integrating national, regional and international protocols, agreements, laws and regulation in order for the three riparian countries to co-manage fisheries and the environment of Lake Victoria. Its main objectives are to: (1) establish a viable system for sustainable resource management; (2) enforce fisheries laws and regulations in the three riparian countries; (3) the harmonization of activities in management and community participation; (4) establish an institutional environment for the sustainable management of a modified property and access regime; (5) adoption the FAO code of conduct for responsible fisheries; (6) develop institutional capacity; and (7) develop proper handling, preservation, processing and storage (*The New Vision*, 26 November 2003).

from the eastern shores ends up in Kenya. They also claim that enforcement of regulation is often used as a pretext to extort bribes (see also Keizire 2004). In general, processors call for a reasonable balance between sustainability and market demands. But the fact remains that most market demand is for products coming from smaller size fish. Small-size individual fillets are less fatty, easier to prepare, and provide the right portion-size. There is not much market for large fillets, except in the Middle East, where they are consumed communally. Even fillet portions, which are now produced in some processing plants in Uganda, are preferred when coming from relatively small fillets, thus not from large fish. Processors argue that if they cannot deliver to buyers' specifications, someone else will (either within the country, around the lake, or in another region). One operator argued that 'as long as the industry is built upon volume, it is difficult to enforce fish size regulation. It will make sense to enforce it only when production moves to 'value-added' lines.[7] Otherwise, the industry will shut down' (UGFP09).

DFR inspectors have indicated that they are aware of the 'catch-22' situation they find themselves in when enforcing minimum mesh size regulation (and related minimum fish size). By implementing these rules, they protect the long-term viability of the industry. Yet, inspectors seem to mirror the view of processors in fearing that, if demand is for small fillets and inspectors insist on strict implementation, the market will go somewhere else. A possible contradiction in this line of argument is that both processors and the DFR are candid on the fact that regulation is difficult to enforce and verify in practice (UGF26). Finally, as we will see in following sections, demand for smaller fillets of Nile Perch (especially frozen ones) has decreased already, without apparently having major repercussions on the overall profitability of the industry.

All the fisheries management tools that have been touched upon so far are based on a framework relying on top-down regulation. This is built upon the estimation of Maximum Sustainable Yields and direct or indirect control of gear type or size restrictions on fish. Two main criticisms have been levied in relation to this approach. The first questions whether, in small and medium water bodies (but perhaps also in bigger ones such as Lake Victoria) the MSY-based approach is the best way of managing fisheries resources, and whether management is needed at all. According to this argument, environmental fluctuations explain much of stock variability in some freshwater lakes in Southern Africa (Jul-Larsen et al. 2002; FAO 2005). Those who take this position high-

[7] The term is put in inverted commas in the paper because what the industry calls 'value-added' products may actually be characterized by lower value addition to the fish itself. Export unit values of fish are generally higher for fresh fish products with relatively low levels of processing (such as fillets) than for frozen, highly-processed products (such as fish fingers).

light that fishing effort has impacted on the sustainability of the resource only where it was investment-driven (this could apply to Nile perch in Lake Victoria), not where it was population-driven (ibid.). They also question whether mesh size regulations, prohibitions on use of certain gear, and minimum fish size regulations are necessary and/or useful, given the general lack of enforcement and the limited status of knowledge on the links between stock dynamics and fishing efforts.

A second line of criticism is based on the observation that traditional top-down approaches to fisheries management (government fishery officials posted at the local level) do not deliver as local communities are either not involved or not given formal recognition (Geheb 2000). Partially as a result of this second criticism (and especially as a result of the kinds of management projects operating on Lake Victoria that have been funded in the last decade or so), Uganda's fishery resource management is slowly moving in the direction of community-based solutions. Uganda's National Fisheries Policy (MAAIF 2004) proposes to increase institutional efficiencies in relation to resource management through the creation of a Uganda Fisheries Agency (UFA) to more effectively link with decentralized government structures and fisher communities. The policy is linked to a draft 'Fisheries Sector Strategic Plan' (MAAIF 2003a). Decentralisation should take place through a national network of Beach Management Units (BMUs) (MAAIF 2003b). This approach follows what in fisheries is known as co-management – power sharing between state and local communities, and a shift of responsibilities from the former to the latter. In this framework, BMUs are supposed liaise with local government via the formation of Lake Management Organizations (LMOs) (Nunan 2004: 32).

Yet, counter-criticism of community-based fisheries resource management also abounds, highlighting that it impinges on how collaboration between communities and local government takes place in practice, given the relatively authoritarian systems that communities are used to (Geheb and Sarch 2002). Counter-critics also argue that it cannot be assumed that (different) communities are actually able and/or willing to take up these responsibilities, and that often these 'participatory' processes are donor-driven and attract little interest locally (see Allison 2003; Allison and Ellis 2001; Hara and Nielsen 2003; Hauck and Sowman 2001; Nielsen et al. 2004). The lesson to be learned here is not that co-management is a bad idea, but that applying the same pre-packaged 'model' in different fisheries and/or different socio-economic and institutional environments will not yield good results, especially if the package is donor-driven.

3.3 AQUACULTURE

Globally, aquaculture accounts for much of the growth in fish production witnessed in the last two decades (Delgado et al 2003: 13). One the one hand, aquaculture can be seen as releasing some of the pressure for the exploitation of wild capture fish, thus helping the sustainability of aquatic environments and stocks. On the other hand, many farmed fish species rely on fishmeal and fish oil for their sustenance, both of which are the result of processing pelagic fish, thus putting increased pressure on the latter. There are also other environmental concerns related to aquaculture, which will be touched upon below.

Lake Victoria has been so far untouched by the aquaculture boom (or 'blue revolution' as it is also known). Fish farming accounts for less than one per cent of total annual fish production in Uganda (IADC 2002: 10). Most of the fish farming that does takes place is based on small-scale pond production. There are a few commercial fish farmers. However, they do not operate for selling grown fish – they sell fingerlings to a government restocking programme and as bait. Efforts are being made to develop aquaculture on Lake Victoria. Commercial prospects are more positive in relation to Nile perch than tilapia, given the strong competition from large-scale farming of tilapia in Asia and Latin America.

At the time of fieldwork, DFR and the industry were collaborating on drawing regulations on aquaculture and Standard Operating Procedures (SOPs) to implement them. These regulations will cover mainly the production aspects of aquaculture. In marketing, wild capture and aquaculture products are generally integrated in the same value chain. The EU has labelling requirements that require the identification of whether a fish has been caught or is a product of aquaculture. However, at the retail level, this distinction is almost always absent.

According to a Uganda-based aquaculture scientist (UGF32), the key issues to be tackled in developing standards and codes of practice for aquaculture in Uganda are the following:

- environmental impact of production
- handling of discharging waters from farm to stream
- control of fish movement within the country, import and export
- use of chemicals and antibiotics
- quality of seed for fingerlings
- GMO issues
- design of farm layout
- quality of fish in the marketplace
- labelling rules (farmed vs. wild catch)

One of the main issues that could impact lake-based wild capture is the current regulation on minimum size of fish, which could be lifted for aquaculture products. Yet, it is difficult to know the difference between farmed and wild-caught fish in the marketplace. This could provide a loophole for juvenile wild-caught fish to find its way in the market disguised as an aquaculture product.

Preliminary research is being carried out at FIRRI's Kajjansi Aquaculture Research and Development Centre with the view of establishing cage fish farming on Lake Victoria. Nile perch at the moment seems the only species for which there is commercial interest and where investment opportunities are being explored (by Zimbabwean and Norwegian fish farming companies).[8] Uganda has the best shoreline for cage farming on Lake Victoria, especially in the sheltered waters between the shore and the Ssese islands. However, cages need at least 10 m of water, and these areas are often shallower than that. One of the first areas that will be tried out for commercial Nile perch farming is the shoreline around Jinja (UGF32). The developments of these trials are likely to determine the long-term sustainability of the fishery resource base on Lake Victoria. As a relatively late entrant in fish farming, Uganda is in the position of learning from successes and failures (environmental as well as commercial) elsewhere. The setting and enforcement of appropriate standards and codes of practice will play a pivotal role in increasing the likelihood of success. These standards and regulations will need to be designed to meet the numerous EU regulations associated to residues (heavy metals, veterinary drugs) and to codes of practice and guidelines for aquaculture.

3.4 EXPORT MARKETS

The Nile perch export industry in Uganda is relatively new. The first recorded exports to Europe and the Far East go back to the late 1980s (NRI and IITA 2002: 86), although some exports of tilapia had taken place in the 1950s from Lake George (UGF01). Increased market demand for Nile perch in the last 15 years has been partly created by declining stocks of cod and haddock in Northern hemisphere waters. Although Nile perch is a fresh water fish, it competes directly with other species in the market for so-called 'white fish' (or 'groundfish') of neutral flavour. Salmon

[8] At Kajjansi, Nile perch is not breeding in captivity yet, but is eating dead fish, as opposed to live one. Tilapia is breeding, but its market is problematic: the local price for tilapia is too low to justify an aquaculture operation; regional markets require a dried product, not justifying the investment either. As noted above, international competition in export markets is tough. Catfish has also been bred and produced in captivity at Kajjansi, but so far no market opportunities have emerged for it.

has also become a direct competitor for Nile perch following the dramatic increase in farmed salmon production and concurrent decrease in its price (Anderson 2003).

In the 1980s, Ugandan fish exports were of regional nature. Previous to 1991, much of the fish processing that was taking place on Lake Victoria was based in Kisumu, Kenya. The Kenyan plants were sending insulated trucks with ice to landing sites in Uganda to collect the raw material. By 1989, some plants had sprung up in Uganda as well (UGF01). In 1991, the Ugandan government placed a ban on the export of unprocessed fish, thus further stimulating investment in local processing capacity (Ogutu-Ohwayo 1999: 51). In the early days, Nile perch was exported in fillet form, and sometimes as headed and gutted (H&G) – all blast frozen (UGF01). At that time, the main market was Australia, where Nile perch was sold as *bora mundi*. Hygiene certificates were needed for export, but the product and the processing plants were never really monitored (ibid.). In 1992, fish was first exported chilled on ice to the EU.

Table 2: Fisheries from Uganda to all destinations (1990-2002)

Year	Fish exports by volume	Fish Exports by value	Export unit value	Total Exports of all products from Uganda	Fish exports as proportion of total exports (by value)
	(tons)	(US$ '000)	(US$/Kg)	(US$ '000)	(%)
1990	1.664	1.386	0,8	177.658	0,8
1991	4.687	5.313	1,1	184.263	2,9
1992	4.851	6.498	1,3	146.767	4,4
1993	6.138	8.943	1,5	201.231	4,4
1994	6.564	10.403	1,6	459.939	2,3
1995	16.046	17.541	1,1	553.938	3,2
1996	13.100	45.030	3,4	703.993	6,4
1997	11.819	27.864	2,4	594.628	4,7
1998	14.688	39.879	2,7	536.747	7,4
1999	9.628	24.837	2,6	478.750	5,2
2000	14.894	30.818	2,1	401.645	7,7
2001	28.119	78.150	2,8	451.765	17,3
2002	27.370	87.447	3,2	475.530	18,4
2003*	25.021	87.680	3,5	522.538	16,8

Sources:
Fish export volumes and values: elaboration from DFR data.
Total exports of all products: data from Uganda Export Promotion Board
Note: * Dec 2002-Nov 2003

As we can see from Table 2, fish exports skyrocketed between 1990 and the early 2000s in volume and value terms. In 1990, there were 1,664 tons of recorded exports for a value of US$ 1.4 million. Between 2001 and 2003, exports peaked at over 25,000 tons for a value of almost US$ 88 million. In comparison, the country's main traditional export crop (coffee) generated foreign exchange for US$ 100 million in 2003. The fish figures capture only exports to outside the region (see section on regional trade below).

Since 2001, fish exports as a proportion of total exports from the country by value have been in the range of 17-18%, against 19-22% for coffee. In 2003, about two-thirds of fish exports went to the EU (see Table 3). The two species exported outside the region are Nile perch and small quantities of tilapia. Ugandan tilapia is perceived as having a 'muddy' flavour and does not have a good reputation in Europe, where it also faces competition from farmed tilapia coming from Latin America and Asia. Export volumes during the year tend to be fairly consistent, with a peak in November and December when fish demand increases especially in the EU (see Figure 2). In general, fish supply is highly inelastic in the short term (correcting for seasonal variations), thus the quantity of fish supplied is similar regardless of the price offered (NRI and IITA 2002: 88). Fish production is usually higher during the rainy seasons (March-June and August to December) as fish come out to spawn.

Figure 2: Fish export volumes, monthly variations (Dec 2002 - Nov 2003, tons)

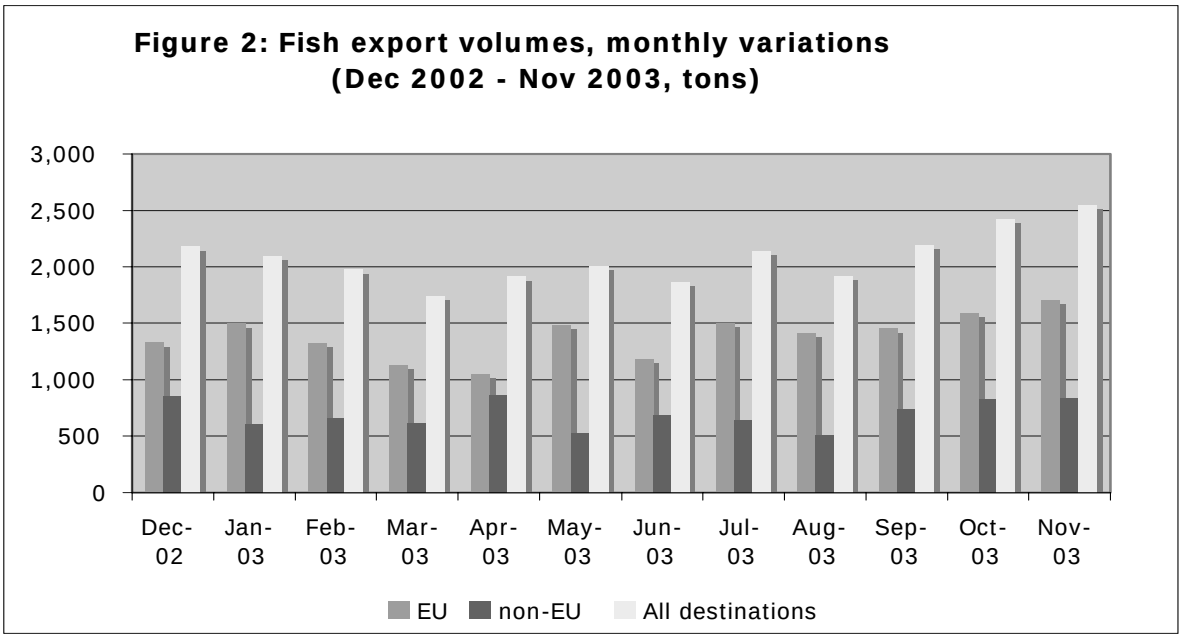


Table 3: Uganda fish exports to all destinations (Dec 2002-Nov 2003)

		Volume (tons)	Value (US$ million)
dec-02	EU	1.328	4,4
	non-EU	856	3,3
jan-03	EU	1.495	5,8
	non-EU	600	2,5
feb-03	EU	1.323	4,8
	non-EU	657	2,8
mar-03	EU	1.129	4,1
	non-EU	617	2,6
apr-03	EU	1.050	3,6
	non-EU	866	3,3
maj-03	EU	1.483	5,2
	non-EU	526	2,3
jun-03	EU	1.181	3,8
	non-EU	688	2,8
jul-03	EU	1.500	4,8
	non-EU	643	2,5
aug-03	EU	1.408	4,4
	non-EU	511	2,1
sep-03	EU	1.451	4,8
	non-EU	740	2,7
okt-03	EU	1.597	4,9
	non-EU	826	2,9
nov-03	EU	1.711	4,9
	non-EU	835	2,6
Dec-02 to Nov-03	EU (US$ million)	16.656	55,5
	non-eu EU (US$ million)	8.365	32,2
	Cumulative (US$ million)	25.021	87,7
	EU (%)	66,6	63,3
	non-eu (%)	33,4	36,7

Source: Elaboration from DFR data

Export unit values have also increased dramatically from 1.1-1.6 US$/Kg in 1991-94 to above 3 US$/Kg in 2002 and 2003 (see Table 2). This level of prices had already been reached in 1996 before the bans, but referred to a much lower volume of exports. For 2003, processors reported receiving average prices of 3.4 US$/Kg for chilled fillet (free-on-board price ex-Entebbe) and 2.8 US$/Kg for frozen fillet (free-on-truck price ex-processing plant) (see Table 4). Prices fluctuated widely in 2003, ranging from 2.5 to 4.9 US$/Kg for chilled fillets and from 2.5 to 4.5 US$/Kg for frozen fillet. The year ended with prices declining for both. According to a number of processors, chilled Nile perch fillet prices were affected by lower salmon prices. Frozen fillet prices, especially small fillets, were affected by competition from farmed basa (a relative of catfish) from Vietnam. However, in general, prices increased markedly from the early-1990s to 2002-2003. This increase reflects three broad changes that have taken place in the meanwhile: (1) an increase in the proportion of chilled fish exports over frozen exports – the former attract higher prices; (2) increasing demand for Nile perch in Europe, especially in chilled form; and (3) more confidence

on the product from buyers following the implementation of EU-demanded Hazard Analysis and Critical Control Point (HACCP) systems in 1999-2001.

Table 4: Average declared export price (2003, US$/Kg)

Company code	Chilled fillet (fob entebbe)	Frozen fillet (fot kampala)
A	3,5	3,0
B		
C	3,5	2,8
D	3,5	2,9
E	3,3	2,5
F		
G	3,3	2,9
H		2,9
I	3,5	2,9
Simple average	3,4	2,8

Source: own interviews

Table 5: Range of Nile Perch products prepared for export

Company code	Number of processing plants	whole chilled fillets	whole frozen fillets	headed and gutted (chilled)	headed and gutted (frozen)	whole fish (fresh or frozen)	fish maws	trimmings	other	Specifications for value added, other info
A	2	X	X	X			X	X	X	fish skins for tanning and frozen blocks; one plant runs value added line: fish fingers, cakes, burgers, fillet portions
B	2	X	X	X	X	X	X			one plant exclusively for fish maws
C	1	X	X	X			X		X	loins, fillet portions
D	1	X	X	X					X	fillet portions
E	1	X	X	X			X		X	loins, fillet portions
F	1	X	X	X						
G	2	X	X	X	X		X			one plant runs value added line: 12 different value added products
H	4	X	X				X		X	skin on fillets (Japan); one plant handles only frozen fillets
I	1	X	X	X	X	X			X	fillet portions, steaks, skin on fillets

Source: own interviews

Table 6: Declared destination of exports (% of total exported fish by value)

Company code	EU	US & Canada	Australia	Far East	Middle East
A	70	0	15	5	10
B	70	15	0	15	0
C	66	19	0	14	1
D	50	50	0	0	0
E	80	2	10	0	8
F	75	4	10	8	3
G	95	2	2	1	0
H	10	15	17	23	35
I	70	10	10	5	5
Simple average	65	13	7	8	7

Table 7: Exports of Nile Perch fillets from Lake Victoria to Europe: volume, value and unit value (1997-2003)

	1997	1998	1999	2000	2001	2002	2003
Total Nile Perch fillet exports from Lake Victoria to the EU							
fresh and frozen (tons)	25.124	23.846	8.433	30.338	40.586	39.303	45.113
Kenya (tons)	7.488	2.447	1.121	30	2.747	3.972	5.086
Tanzania (tons)	9.015	12.506	4.581	26.857	23.063	23.119	26.965
Uganda (tons)	8.621	8.894	2.731	3.451	14.776	12.213	13.062
Kenya (% of total)	30	10	13	0	7	10	11
Tanzania (% of total)	36	52	54	89	57	59	60
Uganda (% of total)	34	37	32	11	36	31	29
Value of Nile Perch fillet exports to the EU							
fresh and frozen (€'000)	87.491	82.032	31.543	125.440	175.163	194.289	169.884
Kenya	26.109	6.589	4.539	125	13.062	19.375	19.134
Tanzania	29.491	42.899	15.699	110.667	99.170	114.235	99.701
Uganda	31.892	32.544	11.305	14.649	62.930	60.679	51.049
Nile Perch fillet exports to the EU by type (volume and value)							
chilled, value (€'000)	58.483	39.642	23.190	99.675	149.591	164.760	141.302
frozen, value (€'000)	29.008	42.390	8.353	25.766	25.572	29.529	28.583
chilled, volume (tons)	14.453	9.708	5.613	22.985	33.487	31.767	36.161
frozen, volume (tons)	10.671	14.138	2.820	7.354	7.099	7.536	8.952
chilled, value (% of total)	67	48	74	79	85	85	83
frozen, value (% of total)	33	52	26	21	15	15	17
chilled, volume (% of total)	58	41	67	76	83	81	80
frozen, volume (% of total)	42	59	33	24	17	19	20
Average unit value of Nile Perch fillet exports(€/Kg, fob)	3,5	3,4	3,7	4,1	4,3	4,9	3,8
Kenya	3,5	2,7	4,0	4,2	4,8	4,9	3,8
Tanzania	3,3	3,4	3,4	4,1	4,3	4,9	3,7
Uganda	3,7	3,7	4,1	4,2	4,3	5,0	3,9
chilled, average	4,0	4,1	4,1	4,3	4,5	5,2	3,9
frozen, average	2,7	3,0	3,0	3,5	3,6	3,9	3,2

Table 5 summarizes the kind of product forms that the 15 processing plants in Uganda prepare. The main exported product forms for Nile perch are chilled and frozen fillets (mostly skin-off, but some skin-on fillets are exported to Japan). Minor export volumes are also recorded for

headed and gutted frozen or chilled fish, frozen whole fish and trimmings in frozen blocks.[9] Two plants have dedicated 'value-added' lines, manufacturing fish fingers, cakes, burgers and other products. The volumes handled so far are small. One of these processors has tried to manufacture and market twelve different products. The market response has been poor so far. According to this processor, Nile perch is an expensive fish to be used for highly manipulated products such as fish fingers, cakes and burgers. Also, there is no acceptance yet in the market for a manufactured food product made in Uganda (UGFP4). Marketing these products with their own brand has proved to be difficult, even though the company is the largest fish processor in East Africa with plants in all three countries. Supermarket chains require volume and a constant flow of supplies, and it is difficult to get shelf space for a new brand. This company has now changed strategy and is developing a marketing operation in consortium with a large South African fish processor. The two companies think that together they will be able to offer a diversified range of fish and related products to European supermarkets – Nile perch covering the upper market segment. These products will be partly marketed under the well-known South African brand, and partly under European supermarkets' and other fish processors' own brands (UGFP4). Finally, a majority of plants in Uganda have now started to prepare fish fillet portions and loins. These portions (20-80g) are then re-packaged in Europe for the preparation of ready-to-eat meals.

According to a fish marketing analyst (Avarasala 2002), future possibilities for Nile perch in Europe are linked to the fact that many supermarkets and hypermarkets have large fresh fish stands where customers can choose different fillet portions. This may work in favour of Nile perch that has fillet sizes that can go over one kilogram.[10] Also, it is a standard practice for supermarkets to display pre-packed trays of fresh fillet portions. According to Avarasala (ibid.), if large-size fillets were to be promoted at a good price, supermarkets could portion them to a variety of sizes depending on their customers' demands. Another potential advantage for Nile perch exports in relation to retail seems to be the increasing popularity of ready meals or semi-prepared meals. Its flaky, neutral-tasting meat is well-adapted to a variety of sauces and condi-

[9] An important export item (in terms of value, rather than volume) to the Far East (especially China and Hong Kong) are air-dried fish maws. This market has developed since 2000, and most processors currently handle them. One of the processors has a plant exclusively dedicated to their preparation. Maws are subjected to different processing (less risky in food safety terms) and are exported completely separately from fish fillets. They are mentioned here only insofar as they represent an off-product of the filleting process that has found valuable markets abroad.

[10] Only one of the Ugandan processors claimed to be able to sell fillet portions processed from large fish. The others reported that they could only prepare portions from smaller fish as requested by buyers.

ments. It may be premature to think of Uganda preparing and exporting a 'ready-to-eat' pack, but Avarasala (ibid.) argues that processors should put more effort in the preparation of re-processor friendly portion packs. This suggests that in the short term, prospects for Uganda may be better in terms of fillet portioning and preparation of loins than for more highly processed products such as fish fingers and burgers.

According to one source, approximately 60-65% of the value of fish exports (less in terms of volume) from Uganda takes place in chilled form. These are air-freighted mostly to the EU (95% of total), but also to Australia, Japan and the US. The remaining 35-40% of exports takes place in frozen form. These are sea-freighted to Australia, the EU, the US, the Middle East, the Far East, and Japan (NRI and IITA: 89-90). Cumulatively, exports to the EU are the most important for the Ugandan industry, accounting for 67% of volume and 63% of value of all exported fish (see Table 3). Interviews with processors confirm this picture. According to these, an average 65% of exports by value go to the EU, followed by the US and Canada with 13%, the Far East with 8%, Australia with 7% and the Middle East with 7% (see Table 6).

Table 7 provides specific information on exports of Nile perch fillets from Kenya, Tanzania and Uganda to the EU, based on EUROSTAT import data.[11] According this table, Nile perch fillet exports from the three East African countries to the EU suffered from the import bans of the late 1990s (and especially in 1999). From 2001 onwards, however, they have recovered and stabilized at around 39-45,000 tons, almost twice the volume level in 1997. The composition of exports by type of product, however, has changed dramatically. Fresh fillet exports by volume have increased from 58% of total in 1997 to 80% in 2003. By value, they went from 67% to 83%. Correspondingly, frozen fillet exports have decreased, both proportionally and in absolute terms.

The regional composition of exports by volume has also changed dramatically: in 1997, the three countries exported approximately one third of total exports from Lake Victoria each. By 2003, Tanzania was exporting 60%, Uganda around 30% and Kenya around 10%. Tanzania was the first country to comply with EU food safety standards and thus the first to recover from the ban

[11] If we compare the figures for export volumes of fish fillets from Uganda to the EU (as in Table 7) and total exports of all fish from Uganda to all destinations for the years 2001-2003 (as in Table 2), we arrive at an average market share for the EU of about 50% in terms of volume and 40% in terms of value. This is substantially less than what found in Table 3 (67% and 63% respectively). It should be kept in mind that EUROSTAT figures do not include imports of headed and gutted fish (fresh and frozen) and whole frozen fish. According to other sources, these exports represented about 6-7% of total exports by volume in 2000 and 2001, and 14% in 2002 (Gabriel 2003). This explains most of the gap between the two different set of figures for the EU market share.

in 2000, followed by Uganda in 2001. Kenya has not quite been able to get back where it was in 1997 in terms of volume of exports due to slower reaction to the EU bans, stricter enforcement against cross-country trans-shipments of fish by Uganda and Tanzania, and increased competition from new processing plants in the other two countries (see Figures 3, 4 and 5).

Average unit prices have been fairly equal around the lake since 2000. They have steadily increased since 1997, but then decreased since 2002 (see Figure 6). As we can see in Figure 7, prices for fresh and frozen fillets tend to follow the same dynamics, although the variability of prices for frozen fillets is slightly lower. In 2003, export unit values were 3.9 €/Kg for chilled fillets and 3.2 €/Kg for frozen fillets (see Table 7). By August 2004, export unit values from the region were in the range of 3.00-3.20 €/Kg for fresh fillets. Exports to the EU take place at a zero tariff rate under the Cotonou Agreement (for all three countries) and the Everything-but-Arms offer (for Tanzania and Uganda, which are LDCs).

Figure 3: Distribution of Nile Perch fillet exports to the EU by country (% of total volume)

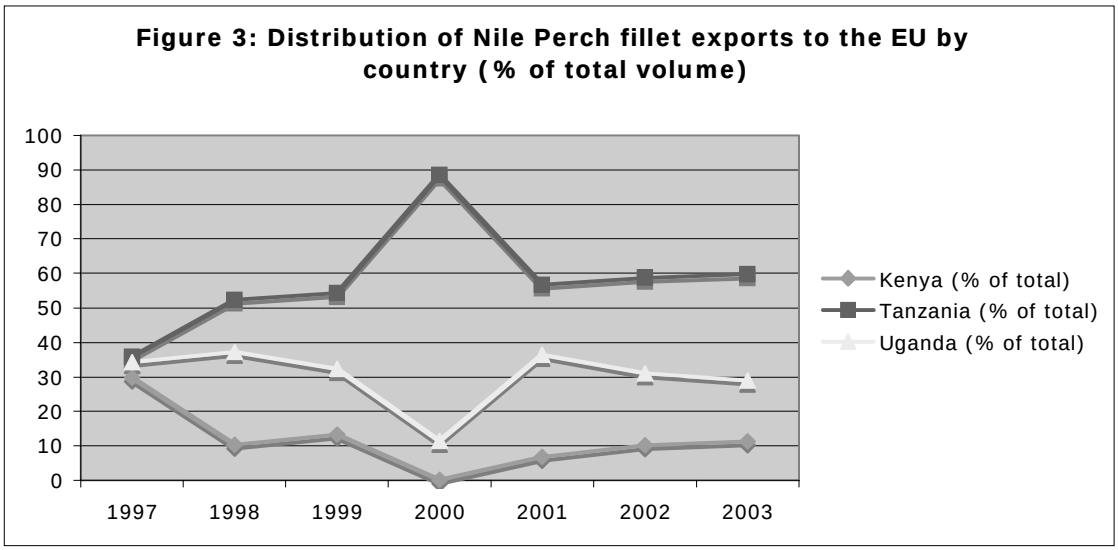


Figure 4: Volume of Nile Perch fillet exports to the EU (tons)

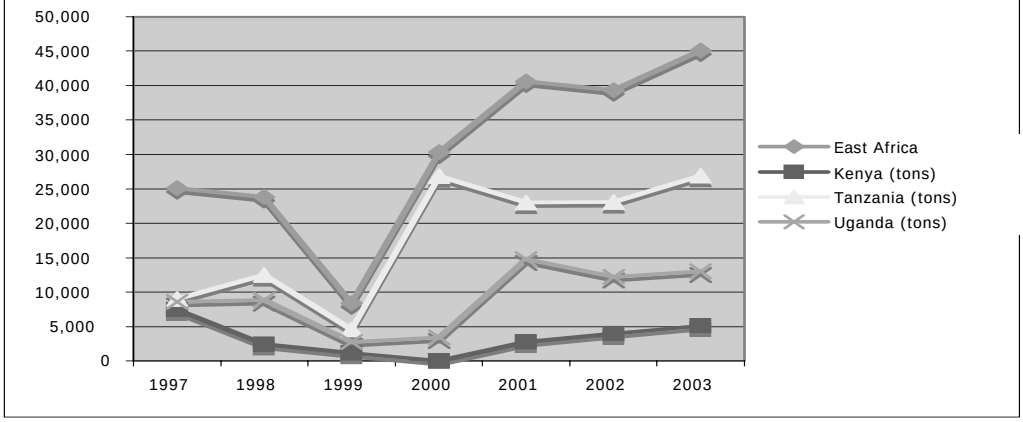


Figure 5: Value of Nile Perch fillet exports to the EU (€)

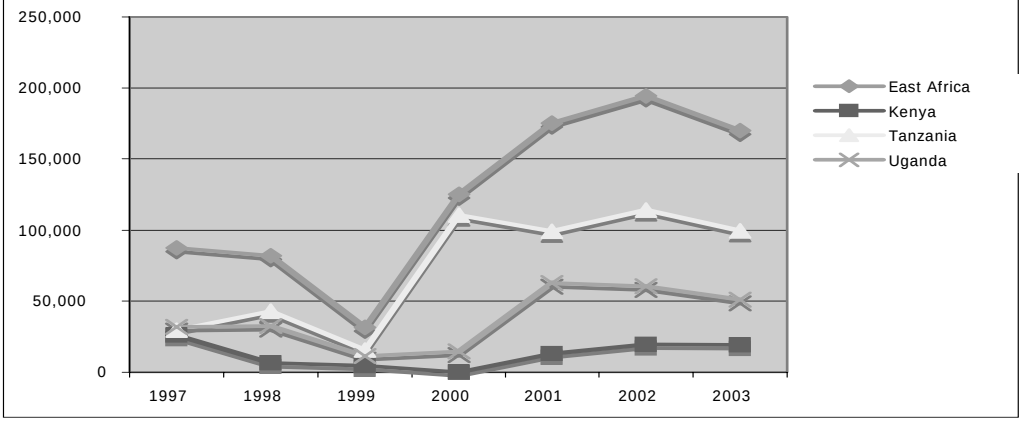
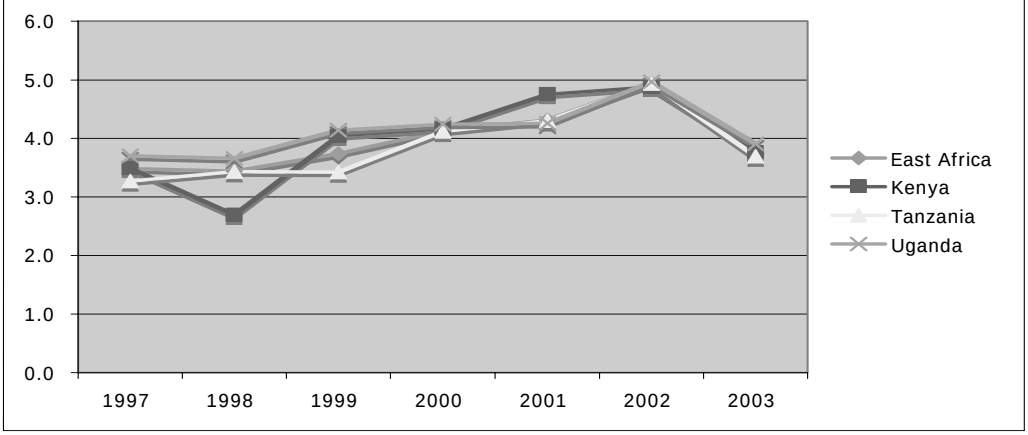
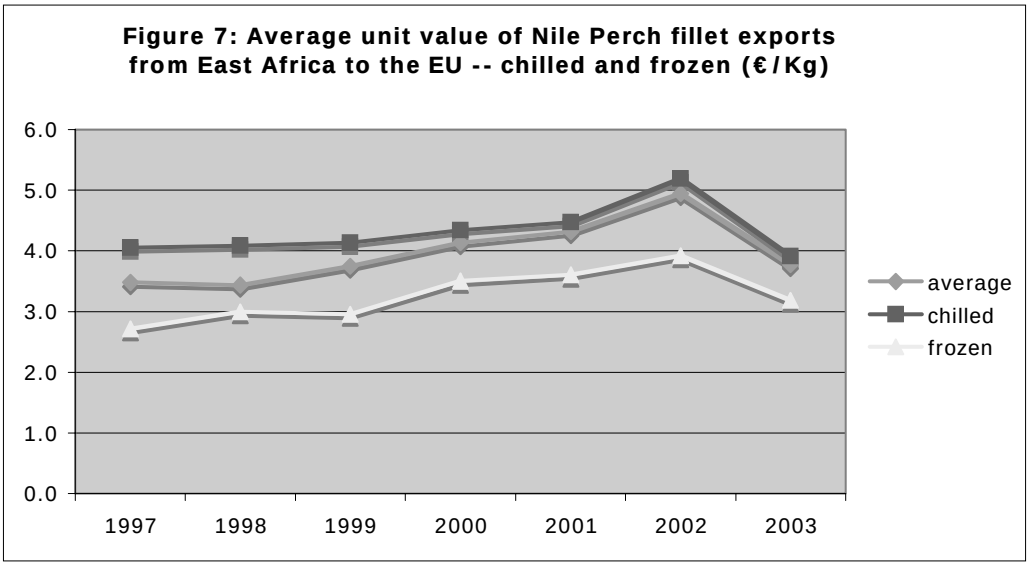


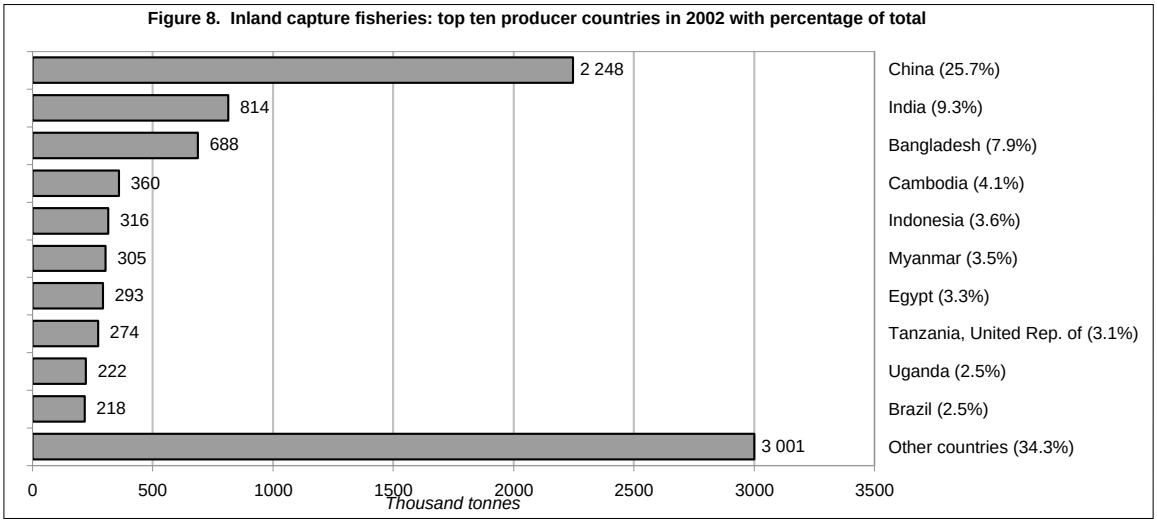
Figure 6: Average unit values for Nile Perch fillet exports to the EU (€/Kg)





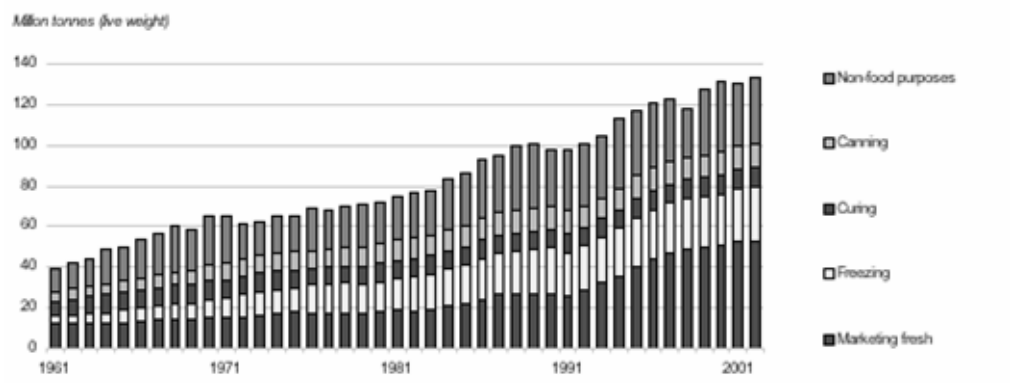
Source for Figures 3-7: Table 7

There have been significant developments in European fish markets during the 1990s and early 2000s. Cod, cod-like species, pollock, hake, halibut, hoki and other white fish (also known as groundfish) contribute to a large proportion of European consumption of fish and fishery products. As the EU streamlined its catch quotas and limited its fishing effort in member country waters, new supply sources of groundfish have opened up. Yet, captures fell from 14 million tons in the mid-1980s to less than 9 million tons in 2000 (Anderson 2003). Atlantic cod represented almost 64% of all groundfish catches in the years leading to World War II; it accounted for only 12% in 2000. In terms of exports, cod still accounted for 32% of the total in 2000, against 33% for pollock. These translate in volumes of about 770,000-790,000 tons (ibid.). In this context, Nile perch has found new market opportunities. The 60,000 tons (live weight equivalent) exported by Uganda makes the country a relevant commercial player. Furthermore, although only a small player in absolute terms in global fish production, Uganda is among the top ten inland capture fisheries in the world, as is Tanzania (see Figure 8). The fact that all three countries on Lake Victoria have the physical and institutional infrastructure that enables them to air-freight chilled fish makes them even more important commercially. The proportion of world fish that is marketed fresh or chilled has increased dramatically in the last few decades – from less than 13% in 1961, to 26% in 1991, and to a staggering 53% in 2002 (Figure 9).



Source: FAO and INFOSA

Figure 9: Utilization of world fisheries production (breakdown by volume) (1961-2002)



Source: FAO and INFOSA

Wholesale prices in Europe for Nile perch in mid-2004 were in the range of 4.5-5.0 €/Kg. Retail prices vary significantly within the EU. A breakdown of volumes by country of final destination within the EU is not possible as Nile perch is not specified in EU trade statistics. The main importing points are Belgium and the Netherlands, which in 2003 accounted for around 60% of total imports into the EU by volume. From there, fish is normally trucked across Europe. However, rough estimates suggest that Spain is the main consumption market in the EU, although volumes seem to have decreased following negative press coverage of Nile perch as a result of the EU bans in the late 1990s. Correspondingly, hake consumption seems to have increased in

Spain (much of it imported from South Africa). Most Spanish fish imports consist of fresh products, rather than frozen.

In Holland, Nile perch fillets are sold in supermarket chains in retail packs of 200-400g, reaching retail prices of up to 20 €/Kg. Italy is an important market especially for chilled fillets – distributed via traditional fresh markets and supermarkets. In 2004, wholesale prices of chilled freshwater fillets in Italy hovered at around 4.8 €/Kg (5.7 US$/Kg), while the retail price was about 9.9 €/Kg (11.4 US$/Kg) in supermarket promotions. The German market is an important one for freshwater fish fillets as well. Trade reports indicate that Nile perch demand has fallen in Germany as a result of the influx of cheap Vietnamese basa. Basa could not be exported to the US at that time following an import ban related to its appellation as 'catfish' (which was deemed illegal as it did not conform to US definitions of the species) (*Globefish Nile Perch Market Report*, April 2005). As a result of competition from basa, Lake Victoria countries are jointly promoting their product in export markets as 'Victoria Perch'.

Market research shows that Nile/Victoria perch is not a very well known variety in Europe. It is nearly unknown as a fish from Uganda in most Southern European markets where it is presently sold. In some markets it is sold as either 'cherne' (a kind of reef cod) or cod-like fish (Avarasala 2002). This situation may change as product labelling becomes more strictly enforced by the EU in all member states. Because the supply of more traditional whitefish species to the EU has been irregular, demand for Nile perch should continue to grow. However, small-sized Vietnamese basa presents a formidable competitor, especially in the lower-price, frozen segment. Paradoxically, this has lightened at least some of the pressure for (illegally) sourcing smaller Nile perch in Uganda.

3.5 REGIONAL TRADE

Uganda does not only export fish to distant destinations. A vibrant regional trade takes place as well, with exports reaching Rwanda, DRC, and Kenya. As a result of the recent peace agreement, Uganda's fish exports to Sudan are also expected to increase in the near future. Cumulatively, exports from Uganda to regional markets were estimated to be in the range of 30-40,000 tons in 2002, with a market value of over US$ 35 million (Nyombi and Bolwig 2004: 19-20). Only a small proportion of this trade, however, seems to be represented by Nile perch.

Four main methods are used in Uganda for artisanally processing fish for local and regional markets: (1) hot smoking (the most popular method); (2) sun-drying, utilized mainly for tilapia and mukene, but also for larger species after they have been split open; (3) salting, more popular

in the Western Lakes, but also increasingly used for juvenile Nile perch on Lake Victoria; this is sold to Northern Uganda and the DRC; and (4) frying, used for tilapia and Nile perch sold in urban centres around the lake shore (NARO 2001: 304). There is also a vibrant market for sun-dried and fried Nile perch fish frames, a by-product of filleting.

In addition to these preparations, fresh fish and fish fillets are exported to Rwanda in apparently sizeable quantities (NRI and IITA 2002: 86). Substantial exports of juvenile and mature Nile perch and tilapia to Kenya are also taking place. Kenyan buyers can offer higher prices than Ugandan buyers because of lower air-freight costs, and lower prices for petrol and outboard engines (see Section 4.3). Until recently, there were no processing plants in Uganda near the border area with Kenya. When the DFR cracked down on this trade, it resulted in an oversupply of difficult-to-sell juvenile Nile perch on the Ugandan side of the border, and prices collapsed. DFR was then forced to ease border patrols.

A FIRRI survey on regional fish markets conducted at ten border posts and border town markets in 2003 (FIRRI 2003a) provides some more detailed information on species traded, source and destination of the fish, and the organizational features of the trade (see Table 8). The main fish species traded and their form vary according to the destination market, but generally include Nile perch juveniles and sometimes by-products (heads, trimmings, skeletons). Except for fresh tilapia exports to Kenya and Rwanda, all other fish exported through the sites covered in the FIRRI study is either salted, sun-dried or smoked.

Table 8: Main characteristics of regional trade of fish from Uganda (2003)

Area	West Nile	South-Western region				Eastern Region		Total
Fish market/border post	Panyimur	Katuna	Bunagana	Kasensero/Lutukula	Mpondwe	Malaba, Osukuru	Busia	
Destination	DRC	Rwanda	DRC	Tanzania	DRC	Kenya	Kenya	
Main species	*Bagrus bayad* juvenile Nile Perch	Mukene, Tilapia	Mukene	Nile Perch, Tilapia	Juvenile Tilapia, Bagrus bayad, Nile perch by-products	Tilapia	Tilapia, mukene	
Form	salted	sun-dried, fresh	sun-dried	salted, sun-dried	salted, sun dried	fresh	fresh/smoke, sun-dried	
Estimated annual exports kinds, tons)	392	189	1350	*	1556	522	907	4916

Note: * not operational at time of survey due to patrolling in Tanzania
Source: FIRRI (2003a)

According to FIRRI, an estimated 5,000 tons of fish are exported regionally through the ten sites selected in its study. Given the partial coverage of the study and probable under-reporting, the overall figure of 30-40,000 tons of fish exports per year to regional markets provided above is likely to represent a reasonable range. Traders interviewed by FIRRI reported that trade in

juvenile Nile perch and tilapia is still carried out from selected beaches, especially on the islands. They also state that this trade has decreased in volume due to stricter enforcement of minimum fish size regulation by DFR. While most of the processed fish trade goes through custom posts, the juvenile Nile perch and tilapia trade follows informal routes (FIRRI 2003a).

4. Actors and operations in the Uganda Nile perch value chain

4.1 FISHING AND LANDING SITE OPERATIONS

Fishing on Lake Victoria is operated artisanally. Thousands of wooden boats catch fish using low-cost methods such as gill-netting, long-lining, trolling and mosquito-seigning. Nile perch is usually fished with gill nets and long lines. Trawling has been banned on the whole lake since 1995 to limit its adverse environmental and stock impacts (Mbuga et al. 1998: 7) and to preserve the artisanal nature of the fishery. However, in the past, a Sino-Uganda joint venture sought to exploit off-shore waters by mechanically harvesting stock that was thought to be out of the reach of artisanal fishers. The project never took off commercially and these trawlers can now be seen on the lakeshore, used as boat cruisers in the fledgling local tourism industry.

Table 9: Main characteristics of Ugandan fisheries on Lake Victoria (2000)

	(n)	(%)
Landing sites	597	
Working fishing boats	15.544	
Ssese boats	9.905	63,7
Parachute	5.341	34,4
Dug-out canoes	269	1,7
Other	29	0,2
Propulsion type		
on-board	0	0,0
out-board	2.031	13,1
paddles	12.848	82,7
sails	665	4,3
Crew	34.889	
Gill nets	297.663	
Derelict boats	2.777	
Transport boats	910	
DFR staff at landing sites	70	
Sheds (bandas)	56	
Cold rooms	7	
Pontoons	34	

Source: MAAIF (2001)

According to the Lake Victoria Frame Survey of 2000, there are around 35,000 crew members operating about 15,500 boats in Lake Victoria. Around 12,800 of these boats are manually operated, 2,000 are powered by out-board engines (either owned or rented), and over 650 are sail powered (see Table 9). Sixty-four per cent of these boats are over 5 meters in length (so-called *ssese* boats), 34% are less than 5 meters (parachute boats, also known as *baotatu*), and the rest are dug-out canoes. Both *ssese* and parachute boats are built from wood planks. There are also an estimated 910 transport boats on the lake (see also Table 10). A large proportion of fishers lives and operates from small islands usually located 10-30 km offshore.[12] In 1990, when the export sector was still in its infancy, there were an estimated 8,600 boats operating in the Lake Victoria fishery. This suggests that, even by the most conservative estimate, employment created directly through fishing effort has roughly doubled between 1990 and 2000. These figures, however, do not include employment generated through beach seining. Although this fishing method utilizing small-mesh size nets from the beach is outlawed, it is still practiced on the lake (NRI and IITA 2002: 88).

A large majority of fishers on the lake are men, with the exception of mukene fishing. Women have more of a role in shore-based activities, such as trading and local processing. Tilapia fishing is operated with small boats by crews of two fishers with few nets and takes place within a few nautical miles off shore. Mukene fishing is operated mainly by women because they run the primary processing operations on shore and prefer to operate their own boats. These are labour intensive operations with crews of usually four people per boat (see Table 6). Nile perch fishing, while still artisanal in the sense that small boats are used, is moving towards more commercial operations. While there are still many single-boat operators on the lake in Uganda, local researchers estimate that the number of larger scale operations run by absentee owners and supervisors is increasing (UGF18; see also Table 10), following a system that is well-established in Tanzania.[13] Motorized boat owners/supervisors usually employ operators who receive 30-40% of the value of fish, either before of after deducting the cost of fuel. The owner maintains boats, engines and nets.

[12] Another study estimates the presence of 219,000 fishers on the Ugandan shores of Lake Victoria, with more than 900,000 people directly depending on the fish industry for their livelihoods – including an estimated 1,800 employed in processing plants (Bahiigwa and Keizire 2003: 11-12). According to a third source, the number of fishers on the lake is around 136,000 (CARANA 2002: 8-9). Key informants suggested that the lower estimate provided by the DFR census (MAAIF 2001) is the more accurate one.

[13] For earlier work on the value chain for Nile perch in Kenya, see Abila and Jansen (1997), Mitullah (1998) and McCormick and Mitullah (2002). For a case study on Tanzania, see Gibbon (1997).

Box 2: Main characteristics and operators in the Uganda Nile Perch value chain

- FISHERS
  - can be fishers/owners of own boat, owners of fleets, fleet managers, labourers on boats
  - fishers sell/deliver Nile perch to boat operators or their representatives (usually at island-based landing/trans-shipment sites); otherwise, if operating closer to the shore, they may sell directly at the landing site
  - fishing/boat transport often vertically integrated
- BOAT COLLECTORS
  - often also own/finance a fleet of boats and/or fishing gear
  - boat collectors often procure ice from fish processing factories or their agents at the landing sites;
- TRADERS AND AGENTS OPERATING AT LANDING SITES
  - independent traders
  - contracted traders operating with their own capital and trucks, but obtaining ice and fuel from the processor on credit
  - commission agents or employees of industrial fish processors, operating the company's own trucks
- OTHER LANDING SITE-BASED OPERATORS
  - artisanal processors (Nile perch rejects, or other species for domestic and regional markets)
  - local traders (transporting fish with bicycles, motorcycles, pick-ups and, more rarely, trucks for local and regional markets)
  - boat repair yards and fishing gear repair businesses
- INDUSTRIAL FISH PROCESSORS/EXPORTERS
  - Nine companies operating, for a total of 15 plants
  - Processing fillets, headed and gutted fish, whole fish and fish maws for export; chilled on ice or frozen
- QUALITY ASSURANCE LABORATORIES, CONSULTANTS, TRAINERS AND CERTIFIERS
  - for GMP, HACCP compliance, ISO certifications
  - servicing industrial processors
  - two certifying agencies
  - a few training and consulting companies
  - two locally based laboratories, both carrying our microbiology tests; one carrying out pesticide residue tests
- COLD STORAGE, HANDLING, FREIGHT AND OTHER LOGISTICAL SERVICES
  - Several clearing and forwarding agencies
  - Two cargo airlines
  - Several passenger airlines transporting fish cargo
  - Two cold storage/handling facilities
  - Two importers with local operations providing logistical services and cargo consolidation
  - Product forms for export:
    - Chilled fish is packed on ice in polystyrene boxes and air-freighted from Entebbe airport
    - Frozen fish is packed in carton boxes, loaded in temperature-controlled containers, and sea-shipped from the port of Mombasa, Kenya
- OTHER OPERATORS IN THE DOMESTIC FISH MARKET
  - Local traders/distributors
  - Artisanal processors and traders of by-products sourced from industrial plants (mostly skins, skeletons, and trimmings)
  - Fish mongers
  - Supermarket chains (Uchumi, Shoprite, Payless)

Table 10: Main characteristics of fishing operations at selected Ugandan landing sites on Lake Victoria (2002)

Landing site District	Dimmo Masaka	Saanya Mpigi	Kasenyi Wakiso	Buwanzi Mukono	Bwondha Mayuge	Bumeru A Bugiri
General characteristics						
Accessed by factory trucks (Y/N)	y	n	y	n	y	n
Zone	1	1	2	2	3	3
infrastructure	6 raised platforms (public)	no facilities	7 platforms (factory-owned) 2 boat-making yards	boat making yard	3 platforms one boat-making yard	one boat-making yard
Operating boats (n)						
ssese (over 5 m)	70	0	65	3	50	25
parachute (under 5 m)	0	30	0	22	100	15
transport		3	15	2	na	2
Fishing unit owners (n)	35	30	35	25	90	40
Operating traders (n)						
truck traders/factory agents	10		7		3	
boat traders		3		2		2
bicycle traders		30	5		3	5
motorcycle traders		5				
pick-up truck traders			20		12	2
Results of sample survey						
Sample (n of fishers interviewed)	21	15	21	11	39	26
Boat operation						
owned (%)	95	93	95	82	54	85
rented (%)	5	7	5	18	46	15
Fishing gear						
gill nets (%)	81	57	90	55	49	46
mosquito seines (%)	19	0	5	0	3	4
long lines (%)	0	43	5	45	49	50
Boat characteristics						
motorized (%)	76	0	76	0	3	8
paddled (%)	24	100	24	100	97	92
Outboard engine operation						
owned (%)	56		68	na		
rented (%)	24		32	na		
Average crew composition (n)						
motorized gill netters	3		2			2
non-motorized gill netters	3	1	2	2	2	2
mosquito seine netters	4		4		4	4
long liners		1	2	2	2	2
trollers					2	2
Landing price (Ush/Kg)						
Nile perch	2100	1500	2200	1800	1900	1800
Tilapia		1000	1000	1000		1000
Mukene	240					
Average catch/month Nile perch (Kg)						
motorized gill netters	570		541		420	903
non-motorized gill netters	213	127	248		151	220
long liners			190	645	225	440
trollers					316	220

Note: Zones
1=rakai, masaka, kalangala, mpigi
2=wakiso, kampala, mukono, jinja
3=mayuge, bugiri, busia

Source: FIRRI (2003b) 'Globalisation and fish utilisation and marketing study', Jinja: FIRRI.

Most Nile perch on Lake Victoria is caught with gill nets (but increasingly also with long lines). Among gill-netters, the average catch of Nile perch per month varies between 400 and 900 Kg for motorized boats, and between 130 and 250 Kg for non-motorized boats (see Table 10). Nets are usually set in the evening and hauled out in the morning. As a result, the freshness of fish at landing will vary depending on when it was caught as spoilage begins soon after death. Fishing grounds are typically 2-4 hours away from island-based transit/landing sites by motorboat. Fishing boats do not carry ice as they are often too small to accommodate it. Fish is placed on the

bottom of the boat, sometimes covered with a plastic sheet or vegetation. As a result of sun and temperature exposure, fish loses shelf-life quickly. Cleaning of boats is not a daily practice, and when done contaminated water from the lake is used. Fish is placed on ice only on the collector boat or in vats placed at the transit sites. Collector boats are open-planked canoes powered by outboard engines, which are sometimes used to transport both cargo and passengers (this mixed operation is now formally illegal). These collector boats deliver fish to the mainland landing sites and come back loaded with ice supplies. They usually provide fishing gear to fishers on credit (mostly nets). Collector boats typically stay 2-3 days around the island sites before coming back to the mainland. If no ice is available, they purchase fish in the early morning from fishers and transport it to the mainland during the same day (NARO 2001: 365-366).

Table 11: Fisheries operators in Uganda: average income earnings per month (2001)

	USh/month	US$/month
Motorized boat owner	437,000	244
Non-motorized boat owner	187,000	105
Nile Perch fisher	279,000	156
Tilapia fisher	129,000	72
Mukene fisher	208,000	116
Crew-member - share system	35,000	20
Crew-member - flat time rate	87,000	49
Average household income (as in the 99/00 NHS)	141,000	79

Source: Odongkara (2002)
Note: average exchange rate for 2001: 1 US$ = 1788 Ush. Source: oanda.com

A survey carried out by FIRRI at 75 landing sites in 2001, covering 1400 fishing units provides a comprehensive picture of income levels in fishery communities (see Table 11). Against the background of a national per household income of 141,000 USh per month as per the National Household Survey of 1999/00, Nile perch (279,000 USh) and mukene (208,000 USh) fishers seem on average to be better off than tilapia fishers (USh 129,000). The mean monthly earnings for motorized boat fishers are also remarkably higher (437,000 USh) than for non-motorized ones (187,000 USh) due to the capacity of the former to reach distant fishing grounds with less competition and carry more nets (Odgonkara 2003: 18). At face value, the picture for crew-members is much less rosy. Crew-members who operate on a proportional share system actually earn less on average (35,000 Ush per month) than those who are paid a fixed amount per time-period (87,000 USh). However, it is not clear from the FIRRI study where and in what fishery a

flat-rate is used for crew-members, as it is a highly unusual arrangement in fisheries. Also, crew-members are usually given food and tarpaulins, which value should be added to their cash wage.[14] Finally, local fish-smoking processors are reported to be earning on average 306,000 Ush, against an average of 214,000 Ush for sun-driers. (Odgonkara 2002).

If increased employment and generally higher household incomes than the national average on the lake are some of the positive aspects of the development of the fish export industry, concerns have mounted over access to affordable fish by local consumers. Fish is an important source of protein in Uganda, providing between 40 and 50% of the total animal protein intake. The national per capita fish consumption is estimated to have been about 7.5 kg in the early 2000s (Nyombi and Bolwig 2004). Abila (2000) argues that access to fish has decreased, especially in non-fishing communities around the lake. Jansen (1999) shows that in the early days of the industry, local consumers benefited from the increase in catches from Lake Victoria. Nile perch and tilapia were available in local markets at relatively low prices, and this promoted a switch in consumption from other traditional fish species. However, more recently, the increase in export volumes has driven local prices upwards. Initially, this led to local consumers to switch to cheaper smaller-size Nile perch and tilapia. However, with more strict enforcement of minimum size regulation, this option has become more problematic (because of the higher risk involved in the trade, prices have also increased) (Nyombi and Bolwig 2004: 16-17). Also, factory by-products are being reprocessed for industrial purposes, for regional markets that offer higher prices (FIRRI 2003), and for the manufacturing of 'value-added' products such as fish fingers for the growing domestic middle class market (although initial steps are being undertaken to export these as well). These trends may have adverse impacts on people using fish frames as food and on the local processors who sell them for a living (Nyombi and Bolwig 2004: 20).

There are an estimated 600 landing sites on Lake Victoria in Uganda, of which about 30% can be accessed by vehicles (see Table 9). Landing sites (gazetted or not) can be classified in three categories: (1) privately owned and operated by processing factories for their exclusive use; (2) factory landing sites that are also open to other operators; and (3) public landing sites. Out of the total 600 landing sites, only 14 had been gazetted and upgraded to handle fish for export in early 2004. Because of the low number of approved sites, processors, agents and traders have to buy fish from non-gazetted sites as well. How they obtain the mandatory local health certificate for the volumes bought at non-gazzetted sites is a matter of speculation. Key informants have suggested that they trans-ship from a non-gazzetted to a gazetted site, and/or obtain a certificate even

[14] I owe these observations to Peter Gibbon.

though the fish has not physically transited through a gazetted landing site. Given the pressure to secure supplies of Nile perch from the lake, and the low number of gazetted sites, this would seem a reasonable strategy on the part of fish trade operators.

A comprehensive FIRRI study examining operations linked to six landing sites on Lake Victoria identifies some of the main characteristics of fishing, trading and local processing operations. These sites cover all the main zones of the Ugandan mainland shore of Lake Victoria and cover both gazzetted (upgraded) and non-gazzetted (basic) landing sites. As we can see in Table 10, non-gazzetted sites (the large majority in the country) have little or no infrastructure, while gazzetted sites have raised platforms for handling fish. The fleet of fishing boats landing at upgraded sites is larger and has a higher proportion of motorized boats (with one exception). On average, boat owners operate two boats on these sites, while in basic sites boat owners seem to operate only one boat. Except for one site, most fishing boats are owned rather than rented. For Nile perch, gill-netting is the most popular fishing technique, followed by long-lining. Two fishers generally operate these boats (except for seine netters, where four people are needed on board). The fishers who are not owners of the boats are usually paid in proportion of the net revenue from fishing effort in the Nile perch fishery (total sales minus expenses). In the tilapia and mukene fisheries, they are paid in proportion of gross revenues (total sales). Average catches vary substantially according to the area, fishing technique, and whether the boat is motorized or not. Landing site prices for Nile perch do not vary that much between similar kinds of site, but are generally lower in basic sites due to more difficult on-land transport to reach them. The kind of landing site also determines the kind of traders that operate there: in upgraded sites, these are truck or pick-up truck traders and factory agents (sometimes supplied by their own transport boats); in basic sites, they are bicycle, motorcycle and boat traders.

A comparative analysis of landing sites that are accessed by factory trucks and sites that are not provides a rough idea of the impact of the development of export markets on local fishing, processing, trading and consumption at the local level. Upgraded landing sites, in comparison to basic sites, are characterized by: (1) higher value of investment by Nile perch fishing units; (2) higher incomes by boat-owners and crew-members; (3) higher risk by crew-members who are paid in proportion of net revenue, instead of gross revenue; (3) lower levels of artisanal processing of Nile perch at the beach level, focusing on rejects and juvenile fish; prices paid by local processors are about 40% of those paid by factory agents; (5) lower levels of activity by local traders in Nile perch, as they can not match prices offered by factory agents; they deal mostly with tilapia and lower quality Nile perch; (6) lower per capita consumption of fish (see Table 10 and FIRRI 2003b). In general, fishers are reported to associate factory trucks with positive impacts – increased fish prices, ready market for fish and employment opportunities. Artisanal pro-

cessors, traders and consumers highlight the negative impacts – high fish prices and competition for fish supplies (FIRRI 2003b: 27-31).

According to a survey carried out in 1999 in 10 landing sites and involving 90 fishers (Namisi 2000), most fishers/collector boats sell their catch at the landing site to independent traders, middlemen and factory agents. A lower proportion of sales goes to local fish processors or directly to the processing factory. According to this study, fishers recognize that processing factories have created employment opportunities, have helped to improve their incomes, and provide a ready market for fish. Yet, fishers are also increasingly disillusioned with factory agents and middlemen. Apparently, instead of buying at the price agreed between the processors and agents, agents will often buy at their own (lower) price, especially if they are the only agent operating on the landing site at that time. Apparently, fishers who have tried to supply factories directly have faced higher rates of rejection than by selling at the landing site. This is seen as collusion between agents and factory management (ibid.).

4.2 INDUSTRIAL PROCESSORS

Industrial processing was introduced in Uganda as early as the 1950s, but the early industrial fish processors collapsed in the 1970s due to the political and economic crises that hit the country. The industrial plants currently in operation were established starting in the late 1980s (see Table 12). There are currently 15 plants in operation in the country, controlled by nine companies. Only one of these companies, the largest one, is part of a group operating other processing plants in Kenya and Tanzania. All the others are controlled by Ugandan (often Asian-Ugandan) capital, with two exceptions (a plant run by a long-term European expatriate and a plant owned by Korean operators).

Most of the information provided in this section was collected by the author through interviews with owners, plant managers and quality control managers of all nine companies. In addition to these nine companies that directly operate their own plants, other three companies occasionally carry out exports, mainly of fish maws for the China-Hong Kong market. These are processed in existing plants for a fee. These three companies were not covered in the author's survey of the industry as they represented only 5% of the total value of fish exports in 2003 (see Figure 10).

According to DFR export data by company, the top two processors account for 43% of all fish exports to all destinations by value – the top five accounting for 74% of the total (see Figure 10). Given that the majority of exports end up in the EU, the distribution of market share for EU-bound exports is fairly similar to the overall one (see Figure 11). One of the top two companies has a specific focus on frozen exports, especially to non-EU destinations, therefore dominates non-EU exports with 29% of the total by value (see Figure 12). The distribution of exports to non-EU destinations is slightly different from the others also on account of the role of dried fish maw exports to the Far East, which are the domain of smaller exporters.

Figure 10: Fish exports from Uganda to all destinations
Market share by company
(% ot total fish exports by value, 2003)

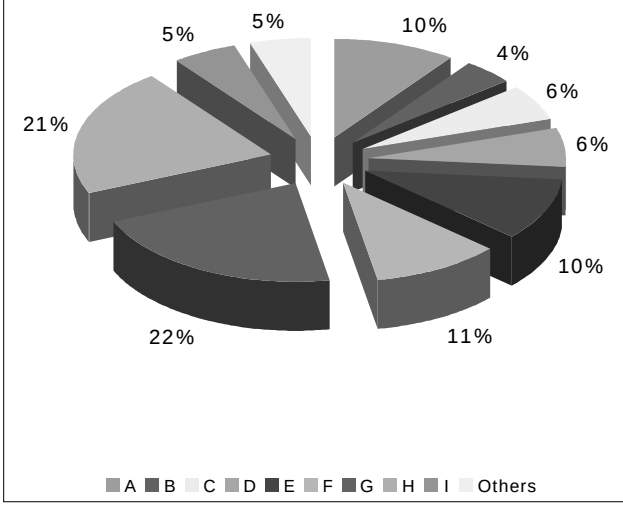
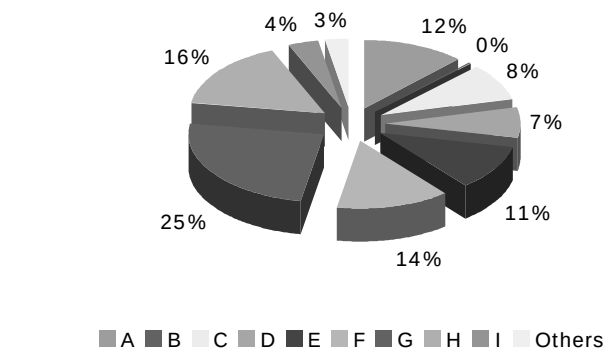
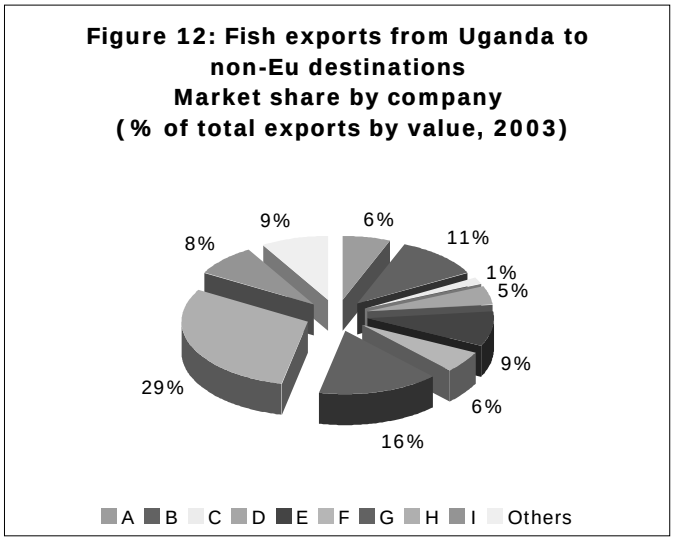


Figure 11: Fish exports from Uganda to the EU
Market share by company
(% of total exports by value, 2003)





Sources for Tables 10-12: elaboration from DFR data.

Table 12 summarizes the main characteristics of industrial fish processors in Uganda. A first series of plants was established between 1989 and the mid-1990s, and was later upgraded to match HACCP standards. Other plants that were also established at this time were later abandoned – in some cases it proved more economical to start a new plant than rehabilitate an old one. A second period of expansion started at the end of the EU import bans in 2000 and accounts for six out of the total 15 operational plants. Consequentially, total installed capacity in the industry has expanded – now potentially handling 530 tons of whole fish equivalent per day. Actual utilization, however, stands at around 39%. These plants provide employment for an estimated 2,500 people. The large majority of fish handled for export is Nile perch, tilapia accounting for only 4% of exports on average. Tilapia is a significant export product for only two companies. Industrial processors cater mainly for the export market, which represent almost 96% of total sales of end-product (thus excluding trimmings, bones and other by-products). Three processors have already started investing in aquaculture, while other two have plans to do the same. Production volumes from aquaculture for the time being are still small.

Processing companies usually purchase fish from public landing sites. Some also operate their own landing sites, sometimes shared with other processors. A few have processing plants directly on the shore and operate a landing site at the factory. Processors buy fish at the factory gate as well, one company exclusively on this basis. Processing companies source their raw material through a variety intermediaries: (1) through employees or commission agents that operate the company's own trucks; (2) through contracted traders that have been working with the company for a relatively long period of time; these traders (truck and/or collector boat-based) operate with

their own capital, but obtain ice and fuel from the processor; and (3) independent traders, who sell on a spot basis at the factory gate or landing site.

Table 12: Overview of industrial fish processors in Uganda

Company code	Number of processing plants (2004)	Operative from (year)	Employment (n) (2002)	Total processed fish by species (% of total value, 2003)		Total installed processing capacity (tons of whole fish/day; 2003)	Actual exports (tons, 2003)	Actual utilization (%)*	Exports as % of total sales by volume (Jan to Jun 2002)	Investment in aquaculture
				Nile Perch	Tilapia					
A	2	1989/2003	366	99	1	90	2,813	26.0	99.8	yes
B	2	1991/2004	187	90	10	10	247	*	100.0	no
C	1	1996	120	97	3	20	1,463	61.0	93.5	no
D	1	1989	211	85	15	20	1,800	75.0	92.1	yes
E	1	1995	160	95	5	60	2,883	40.0	96.1	planned
F	1	1993	350	100	0	45	2,682	49.7	97.8	no
G	2	1994/2000	403	100	0	115	5,301	38.4	94.0	yes
H	4	1994/2003 (3)	600	100	0	120	5,866	40.7	97.7	planned
I	1	1992	128	100	0	50	1,259	21.0	92.5	no
Total/average	15		2,525	96	4	530	24,314	38.6	95.9	

Sources: Own interviews, except for employment figures and exports as % of total sales (SPEED project documentation) and actual exports (DFR data)
Note: * Assuming 300 days of operation per year and a yield of fillet/whole fish of 40%; factories processing exclusively fish maws not included

Table 13: Characteristics of fish processors' procurement systems

			Source of fish (% of total purchases by volume)		
Company code	own landing sites	number of landing sites operating from (n)	own trucks, employees, commission agents	contracted traders (supplied with ice and fuel)	independent traders
A	0	12	10	80	10
B	0	na	33	33	34
C	0	8	30	70	0
D	1	many	40	60	0
E	1	many	0	50	50
F	1	9	98	0	2
G	1	9	20	40	40
H	5	20	30	70	0
I	0	0*	0	100	0

Note: * buys at the factory door only
Source: own interviews

The distribution of purchases among these three channels varies dramatically from processor to processor (see Table 13). With some exceptions, however, processors tend to rely more heavily on contracted traders than on own operations, and less on independent traders. This suggests a certain degree of vertical integration and/or close-knit contractual relations between trading and processing functions – probably the result of strong demand for Nile perch exports and the per-

ceived need for a more hands-on management of fish quality, at least from the landing site to the factory gate. One processor stated that operating own trucks is important to secure constant flows of supplies. It also allows processing plants to widen and diversify their networks of contacts. High level of competition for the raw material means that processors source from remote sites as well, adjusting for the price offered according to transport costs (UGFP1). Industrial processors used to operate their own transport boats to buy directly from fishers as well; this practice was discontinued due to the complex logistics and risk involved.

In 2003, the average price paid for Nile perch (whole fish) at landing sites was about 1 US$/Kg, ranging from 0.8 to 1.3 US$/Kg depending on the operator (see Table 14). This is approximately the same price declared by fishers in 2002 in selected landing sites (as in Table 10). As mentioned earlier (see Table 5), the main products prepared by these factories are fresh and frozen fish fillets. The preferred fillet size for the European market is 200-500 g. Japan will accept fillets up to 1.6 Kg of weight. Anything larger is exported to the Middle East and Hong Kong (UGFP9). The ratio of fillet to whole fish weight is usually in the range of 0.4, but depends on the cut requested. If no red meat is allowed in the fillet by the importer, the ratio is lower due to heavier trimming (0.33 to 0.36).[15] If the skin is left on the fillet, the ratio is higher (UGFP3).

Table 14: Average price paid at landing sites for Nile perch (whole fish, US$/Kg, 2003)

Company code	Price (US$/Kg of whole fish)
A	0,8
B	
C	0,8
D	1,1
E	1,3
F	
G	1,2
H	1,0
I	1,0
Simple average	1,0

Note: Average exchange rate for 2003: 1 US$ = Ush 1845
Source: own interviews

[15] Bleeding, or the presence of red-color meat, is tolerated in fresh fillets in Europe, but not in other OECD markets. For frozen fillets, it is avoided altogether because it tends to turn to an unwanted brown color.

4.3 EXPORT/IMPORT OPERATIONS: LABORATORY SERVICES, LOGISTICS AND DISTRIBUTION

Nile perch fillets are exported either chilled (packed on ice in polystyrene boxes), or frozen (packed in carton boxes and stacked in temperature controlled containers).[16] Each consignment has to be accompanied by an export health certificate released by DFR, showing that the consignment meets the sanitary standards set in regulation (see details in Section 5). Processors are effectively exporters as they are in charge of obtaining health certificates and other export documentation. However, logistics and cargo operations are carried out by other actors, including fish importers.

Up to the mid-1990s, before the EU fish import bans (see below), samples for analysis had to be sent from Uganda to Europe for laboratory testing. In 1998, a Belgian-based company that had been involved in providing testing services for the fish industry in Uganda was contacted by a major fish importer about the possibility of opening a laboratory in Kampala. This private laboratory became operational in 1999. In addition to microbiological and pesticide residue analysis on fish, the laboratory also performs pesticide residue analysis for EUREP-GAP certified horticultural exporters. A second laboratory is equipped for carrying out microbiology testing, but not pesticide residue analysis. This was established with UNIDO support and is run by the Uganda National Bureau of Standards (UNBS). Accreditation capacity in Africa is present only in South Africa, where the private laboratory has obtained its accreditation.[17]

Only about 10 importers handle the bulk of Nile perch imports from East Africa, five of which are the main players. Two of these have operations on the ground in Uganda. Their main business locally is to coordinate logistics and either sell cargo space or buy fish on their own account to fill cargo space. In addition to these, there are two cold storage and handling companies, two cargo charter operators, and a number of clearing and forwarding companies based in Entebbe. One of the locally-active fish importers is partially vertically integrated – it co-owns both one of the handling companies and one of the cargo airlines based in Entebbe. As far as the author knows, there is no formal coordination among fish processors for collective airfreighting fish out

[16] In either case, the information on the fish box for export includes: species name, origin (country), courier dispatch, name of importer, storage conditions to be followed, net weight, grade, production date and expiry date.

[17] Accreditation certifies the general operations of a laboratory as specified in standard ISO 17025. This covers competence in operation (traceability of samples, handling of samples, etc) but does not cover all operations carried out by a lab. A lab defines a number of analyses for which it seeks accreditation. If other analyses are carried out, it is up to the buyer of those testing services to decide if the general accreditation is enough.

of Uganda. Cargo consolidation is a function carried out by logistics companies and two of the importers.

One of the local cold storage and handling facilities was established in 1997 and can process up to 250 tons a week and services both scheduled passenger flights and one of the cargo airlines. Handling charges range between 0.05 and 0.06 US$/Kg. They include services such as: handling, storing, issuing air bills, labelling, weighing, screening, palleting, and loading on to aircraft (UGF24). Clearing is done separately by clearing and forwarding companies on behalf of fish processors. Of all volume of export cargo handled by this company, 70% is constituted by fish, followed by fresh fruit and vegetables (20%) and general cargo (10%). About 3% of air-freighted fish is frozen, the rest is chilled -- almost all of it Nile perch fillets, sometimes headed and gutted fish. A second handling company was established in 2000/01 and carries out services in large part for one of the cargo airlines operating from Entebbe.

The two cargo airlines based in Entebbe run scheduled cargo flights to Europe and load a mixture of fish and other fresh produce. Belgium, Holland and England are the main destinations of these flights. One of these airlines operates four weekly flights to Europe, carrying 25-30 tons of fish per flight (27-32 tons with packaging). DC-10 aircraft are used, which can handle 65-68 tons of cargo. The rest of the cargo is usually fresh fruit and vegetables and cut flowers. The second cargo airline (established in 2002) operates twice-weekly flights with DC-8 aircraft. Other cargo airlines provide occasional chartered services.

In 2004, the rates charged for fish air-freight to the EU by cargo airlines were in the range of 1.40 – 1.46 US$/Kg of fish fillet-equivalent weight (UGF21; UGF31). This rate includes all services, except for clearing and handling of the export health certificate. Passenger airlines charged in the range of 1.45 to 1.81 US$/Kg. Additional charges faced by importers in Europe include clearing, handling and transport to their warehouse. These costs are higher than the ones incurred in Tanzania and Kenya. Chartered flights operating old Russian aircraft from Mwanza were said to charge 1.15-1.20 US$/Kg for fish in 2004. Rates from Nairobi were reported to be in the rage of 1.20-1.40 US$/Kg. This is partially explained by differentials in the cost of aviation fuel: 0.45 US$/l in Uganda; 0.39 US$/l in Tanzania, and 0.34 US$/l in Kenya (*The Monitor*, 7 October 2004).

Frozen fish is sold either free-on-truck (fot) ex-factory gate or cost-and-freight (c&f) ex-import point. Fish is loaded in temperature-controlled containers, trucked to Mombasa and sea-freighted. In 2004, a typical charge for transporting a 20-foot container (loading about 17 net tons of fish) from Kampala to Mombasa, plus clearing and handling was about US$ 3,000 (or 0.18

US$/Kg). Total costs between the factory gate and the import point were estimated by industry players to be about 0.33 US$/Kg (down from 0.44 US$/Kg in 2001 – see Avarasala 2002). While overall transport costs seem to be decreasing, internal transport costs still represent approximately 50% of all costs incurred between the factory gate and the import point. To these, the cost of transport between landing sites to the factory gates should be added – on average 0.1 US$/Kg of whole fish (or 0.25 US$/Kg of fillet equivalent weight) in 2004.

Once fish consignments are cleared at the import point in Europe, they are transported to the importer's cold storage facilities. From there, they are normally trucked all over Europe. Importers sell in bulk to either to fish processors (if further processing and/or packaging is needed), distributors/wholesalers or directly to supermarket chains. Distributors/ wholesalers on their part supply fish shops, fish auctions, local fish markets, catering businesses, restaurants, and supermarket chains.

4.4 DISTRIBUTION OF VALUE ADDED ALONG THE NILE PERCH CHAIN

This section examines the distribution of value added along the Nile perch fillet chain – from fishers to supermarket shelf. Table 15 provides information on the prices paid at key transaction points along the chain, the value added in between these points as a proportion of the sale price at each point, and the price level as a proportion of the retail price as fish moves from catch to consumption. Prices are provided in relation to fillet-equivalent weight. Wholesale and retail prices refer to the Italian distribution and consumption market. This is done to compare the fish value chain with another key export value chain for Uganda (coffee), although the comparison should not be taken at face value for reasons that will be explained below.

Table 15 shows that about 9% of the retail price for Nile perch fillets (with appropriate weight adjustments) filters down to the crew operating the boats on Lake Victoria. This is assuming that the collector boat trader also owns the fishing boats and that crew are paid 40% of the landing site price, as is customary on the Ugandan shores of Lake Victoria. If the fisher owns his/her own boat, the proportion of the retail price retained will vary between 9% and 22%, depending on whether the fish is sold to boat collectors directly from the boat, on island-based landing / trans-shipment sites, or at the mainland landing sites. The landing site price for fish is about 22% of the retail price, increasing to almost 30% at the export point.

Table 15: Distribuition of value added for Nile Perch fillet (chilled) and coffee in the respective Uganda-Italy value chains

Nile Perch (2003)				
Value chain node	Details	Price level (US$/Kg)*	Value added as a propotion of selling price (%)	Price as proportion of retail price (%)
Boat	price paid to boat operators	1,0	100,0	8,9
Landing site	price paid by buyers to collector boat owner	2,5	60,0	22,3
Export	fob (free on board) ex-Entebbe; paid by importer to processor	3,4	25,1	29,7
Import	cnf (cost, and freight) ex-import airport;	4,8	29,6	42,2
Wholesale	price paid by supermarket chain to importer/wholesaler	5,7	15,3	49,8
Retail	consumer price at supermarket (VAT excluded)	11,4	50,2	100,0
Coffee (2001/02)				
Value chain node	Details	Price level (US$/Kg)**	Value added as a propotion of selling price (%)	Price as proportion of retail price (%)
Farm-gate	selling price to local trader	0,3	100,0	6,7
Export	fot (free on truck) ex-Kampala	0,5	33,3	10,0
Export harbour	fob (free on board) ex-Mombasa	0,6	19,2	12,4
Import harbour	cif (cost, insurance & freight) ex-EU import harbour	0,7	13,3	14,4
Roaster	selling price to supermarket chain	4,0	83,4	86,6
Retail	consumer price at supermarket (excluding VAT)	4,6	13,4	100,0

Fish fillets
* fillet-equivalent weight; conversion ratio fillet/whole fish = 0.4
Average exchange rate 1 US$ = 1845 Ush (Jan-Dec 2003)
Source: own interviews for all prices except for wholesale and retail prices (Globefish, Nile Perch Market Report, April

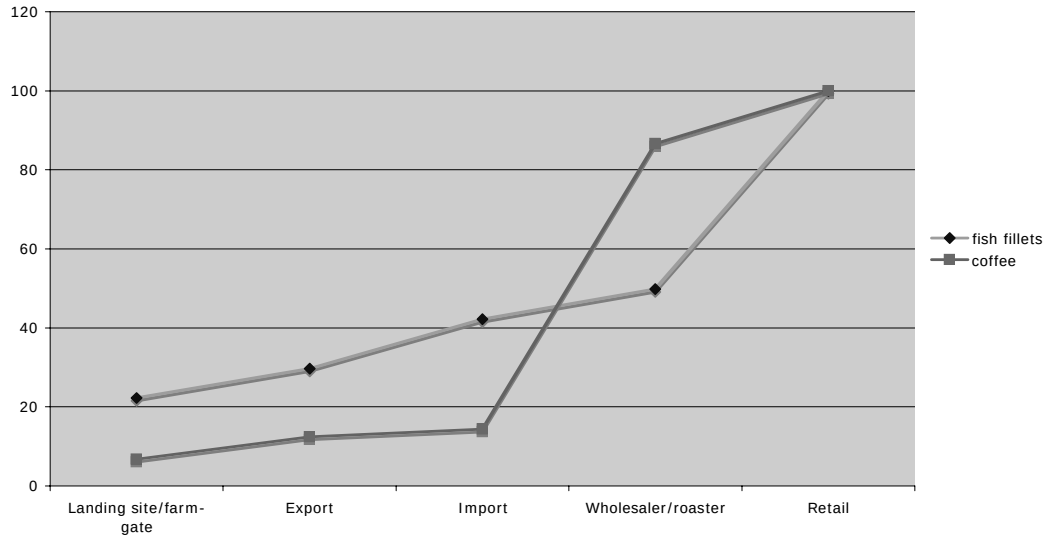
Coffee:
Note: ** roasted coffee-equivalent weight; conversion factors: hulled/unhulled = 0.55;
export grade green/hulled = 0.95 due to drying and sorting losses in export preparation in Uganda; roasted/gree
Average exchange rate: USD 1 = ITL 1,743 (average Oct 2001 - Sept 2002; source: www.oanda.com)
Source: Adapted from Daviron and Ponte (2005)

Given the high cost structure of the industry and the complex logistics (at least as chilled fish exports are concerned), one should not make too much of the distribution of value added. A more appropriate indicator of profitability in the value chain would be gross margins (gross income from sales minus cost of variable inputs). This kind of data, however, is nearly impossible to collect due to the secrecy surrounding specific commercial information. Even trickier is a comparison of the distribution of value added in two different chains where the cost structures are profoundly different. In fish, risk of spoilage and rejection is higher than in coffee all along the value chain. When presented on ice, the labour costs of fish retailing in supermarket chains are

higher than simply placing coffee packages on the shelf. On the other hand, marketing and advertising costs for branded coffees are higher than in fresh fish, which is rarely branded.

As a result, only a couple of tentative observations from data on value added will be made here. Again, these should be treated with extreme caution. As we can see in the bottom part of Table 15 and in Figure 13, the proportions of final price paid to domestic operators at various levels of the value chain are much higher in fish than coffee, both at the level of farm-gate/landing site (22% against 7%) and at the export point (30% against 12%). In both fish and coffee, however, actors between the farm/landing site and the export point do not seem to add much value when compared to other actors along the value chain. Fish processors' value addition, however, is markedly higher than the cumulative value added by coffee traders, primary processors and exporters. This may just be a reflection of the different cost structure in the two value chains and does not necessarily indicate better profitability for domestic operators in fish than coffee. Yet, qualitative statements made by operators in the two industries to the author suggest better profitability in fish.

Figure 13: Distribution of value added along the fish and coffee value chains originating in Uganda (% of retail price)



Among the actors operating in the consuming country segments of these value chains, the largest value addition is made by supermarket chains in fish (about 50% of their selling price) and roasters in coffee (83% of the selling price). In general, domestic actors in Uganda obtain higher unit values, add more value and gain a higher proportion of the retail price in the fish value chain

than in the coffee value chain. This could be attributed to several concurring factors: (1) a more expensive cost structure of domestic operations in fish than in coffee; (2) a fish supply deficiency in Europe pushing up export prices, compounded by decreasing catches in Northern fisheries – thus strong demand for groundfish in general, including Nile perch products; this is in contrast to the oversupply situation in the coffee market (see Daviron and Ponte 2005); (3) a higher degree of vertical integration between international traders and exporters in coffee than in fish; a number of large coffee exporters in Uganda are owned by large multinational companies, while fish processing plants are generally locally owned; this makes the option of internal price transfer less likely to happen in fish than coffee (leading to higher declared export prices); industry actors also suggested the presence of healthy competition among fish importers to source the raw material in Uganda, in contrast to the situation in coffee; and (4) a much less concentrated processing, distribution and retail industry in Europe in fish than in coffee. Again, these are just preliminary observations that merit more research and systematic assessment to be explored in detail.

5. Fish safety standards: Uganda before and after the EU import bans

5.1 REGULATORY FRAMEWORK ON FISH SAFETY STANDARDS

The Department for Fisheries Resources (DFR) within the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) is the sole competent authority for the inspection and certification of fish and fisheries products destined for export. Its main functions are: (1) setting national standards for the capture, processing and marketing of fish; (2) monitoring the health of fish in national waters, and conserving fish species through sustainable exploitation; (3) collecting and maintaining national fisheries information; (4) providing technical advice on processing and handling fish for export; (5) inspecting processing and marketing firms for compliance with national and international standards; and (6) carrying out specific inspection and monitoring duties with respect to the safety of fishery products destined for export.

Its operations are legally based on the 2004 ‘National Fisheries Policy’ (replacing the previous ‘Fish and Crocodile Act’ of 1964), and the ‘Fish (Quality Assurance) Rules, 1998’. The 2004 National Fisheries Policy (MAAIF 2004) provides the basic framework regulating fishing and marketing – ostensibly on the basis of sustainable resource management. It provides general guidance on food safety, fish marketing, aquaculture, and environmental impact assessment. It

clarifies both cooperation and division of functions between the central regulatory authority and decentralized institutions and communities. The 'Fish (Quality Assurance) Rules, 1998' regulate inspections in detail and the approval of establishments and official landing sites. They also prescribe the application of HACCP systems, good hygiene and manufacturing practices, conditions for storage, transport and packaging, and set modalities for issuing sanitary certificates for export. Under these rules, three main regulatory instruments have been created: (1) Standard Operating Procedures (MAAIF 2000) to guarantee quality and safety of fish and fishery products; (2) 'Procedures for Inspections of Fresh Fish for Export'; and (3) a programme for monitoring residues and trace elements in water, sediments and fish.

All registered processing plants in Uganda are currently HACCP-compliant, and Uganda is placed in the List I of countries that can export fishery products to the EU from any establishment approved by the local competent authority. All plants have also been certified against the ISO 9001:2000 standard for quality management. The processing industry association (UFPEA – Uganda Fish Processors and Exporters Association) has adopted a voluntary code of Good Manufacturing Practice (GMP).

The central offices of DFR are staffed with 17 inspectors who monitor the overall system and operations at processing plants. Another 20 or so inspectors operate at the 14 landing sites that are officially gazetted to handle fish for export. These inspectors issue local fish health inspection certificates that are needed to move fish from a landing site to a processing factory. These certificates contain information on supplier and buyer of fish at the landing site and the origin of the fish.[18] The origin of the fish is a generic denomination (a certain group of islands), as it is not possible to follow it upstream from the collector boat (UGF25).

On paper, the landing site inspectors are supposed to check all incoming consignments of fish. Local inspection normally consists of an organoleptic analysis of fish freshness. Samples may be taken for further laboratory tests if the need arises and the batch of fish may be impounded. After inspection, fish that is directed to the export processing plants is issued with a local health certificate. In addition to product testing, fish inspectors are supposed to fill an inspection checklist for upstream operations. This checklist includes inspections of vessels on the lake, procedures

[18] On the supplier side, the certificate contains information on date and time of landing, name of supplier, boat registration number, origin of the fish and weight. On the buyer side, it indicates the owner of the truck, the number of fish loaded, time landed, truck registration number, approximate weight, species, buyer and destination.

carried out at fish landing, appropriate handling for transportation, and landing site infrastructure. These aspects do not appear to be routinely monitored, especially on the lake.

Monitoring of quality assurance systems at the processing level is based on a combination of scheduled and unscheduled visits by inspectors based at the central offices of DFR. Once a year, an inspection is carried out in each processing plant for the renewal of the license. This includes an evaluation of conformity to the general requirements set by regulation for fish processing plants (MAAIF 2000).[19] Once a month, routine inspections are supposed to evaluate traceability, material balance (at production and export levels), and conformity to requirements for general hygiene and handling practices.[20] They also include the taking of water samples and swabs from surfaces in processing plants (ibid.). Fish inspectors have the responsibility of ensuring that HACCP programs applied by the processors are properly designed and implemented. This is done in two steps: (1) through an assessment and review of the HACCP manual, including possible adjustment in flows, plant layout and equipment (usually, once a year); and (2) through on-site verification to establish whether the approved HACCP manual is properly implemented (usually, twice a year) (ibid.).

Product testing for the presence of heavy metals and Total Volatile Bases (TVBN) analysis is carried out twice a year. For each export consignment, official inspectors are supposed to take product samples and submit them for organoleptic, microbiological (total plate count, total Coliforms, E. coli, Salmonella, S. aureus) and pesticide residue analysis to one of two local laboratories that have accreditation credentials recognized by the EU.[21] Health certificates are

[19] The annual inspection covers requirements on: plant layout, fish handling and processing areas, chill rooms, ice rooms and cold stores, systems of handling by-products, water supply systems, waste management, changing rooms, showers and toilet facilities, cleaning and disinfecting equipment, and freezing and cold storage facilities.
[20] Monthly inspections cover: hygienic conditions of facilities, equipment, personnel, ice, containers, evacuation of waste, handling of fresh products, storage, conditions concerning parasites, packaging, and health control checks.
[21] In addition to these tests, DFR is mandated to regularly monitor levels of pesticide residues and trace elements in water and sediments on Lake Victoria.

awarded to export batches that pass specific tests in accordance to the EU fish quality directives. Inspectors usually visit processing plants once a week to issue these certificates.[22]

For frozen exports, health certificates are issued when the result of tests are known. In the case of fresh exports, the certificate is issued pending the results of microbiological analysis (which takes five days; pesticide residue results can be ready in one day) and a recall procedure is used.[23] There are currently no standards or operating procedures for fish destined to local and regional markets (UGF26).

5.2 FISH SAFETY MANAGEMENT IN HISTORICAL PERSPECTIVE

The fish quality management system currently in place in Uganda is the result of adjustments made in the late 1990s and early 2000s in response to three import bans placed by the EU on Uganda (and Kenya and Tanzania) between 1997 and 2000. In 1991, the EU promulgated EC Regulation 91/493 on the 'Production and placing on the market of fishery products for human consumption'. This regulation required the introduction of systems of inspection and control to ensure human consumption safety both in EU countries and in countries willing to export to the EU. These measures included compliance with 'Good Hygiene Practices' (GHP) and the application of HACCP procedures. In addition, competent authorities in third countries needed to demonstrate adequate control. These regulations have now been integrated in the so-called 'hygiene package' or regulations by the EU that comes into force in 2006. The details of these and other regulations that affect fish exports from Uganda can be found in Appendix 1.

[22] Export health certificates include the following information: country of origin, serial number, competent authority, reference number, details of batch, fishery product/aquaculture product, species, presentation (frozen, fresh), type of package, number of packages, net weight, required storage temperature, name of company and EU registration number, dispatch location, destination, transport means, dispatcher name, consignee name. Issuing a certificate costs USh 20,000 (approximately $11).

[23] In addition to official tests required by Ugandan regulation for all export consignments, tests are also carried out for private use by processors and importers. Importers carry out their own spot tests on consignments (about twice a month) both before export and at the import point (mainly, microbiological tests).

Box 3: Chronology of EU fish import bans

- February 1997 – Spain and Italy claim that their authorities have detected high levels of bacterial contamination (including *salmonella*) in products from Lake Victoria: they impose a bilateral ban on fishery product imports
- March 1997 – EU inspection confirms 'serious microbiological contamination'
- April 1997 – EU requires mandatory tests for salmonella on imports of Nile Perch from the three East African countries; these tests are paid by exporters or importers
- December 1997 - June 1998 – following an outbreak of cholera in East Africa, the EU bans the import of fresh fish and imposes mandatory tests on frozen fish from East Africa; lifted because it was not based on scientific evidence, but on EU claims that the competent authorities were not applying sufficient measures to control the outbreak of cholera (Waniala 2002: 2)
- November - December 1998 – EC sends a Food and Veterinary Office mission to Uganda to assess compliance of the production conditions of fishery products and to verify corrective measures identified in the 1997 mission; two processing plants are found not compliant; commission requests guarantees in relation to six perceived problems:
    - lack of suspension of plants failing to meet conditions laid out in EU regulation
    - issuing of health certificate for incorrectly labelled products
    - issuing of pre-stamped health certificates
    - lack of routine monitoring for presence of chemicals in fish and water
    - lack of sanitary infrastructure and fencing at landing sites
    - lack of microbiological check tests supporting health certificates
- December 1998 – the two non-compliant plants are removed from the list of approved establishments; in the same month, the Uganda press reports instances of fish poisoning in lake Victoria
- March 1999 – Based on press reports, a number of District authorities ban fish sales. UNBS notifies the EU that it cannot guarantee the safety of fish exports despite opposition from UFPEA
- April 1999 – EU holds a meeting in Brussels with representatives of competent authorities from Uganda, Kenya and Tanzania to discuss the results of tests; the EU announces a ban of exports of fresh and frozen fish from the three countries
- August 1999 – EU mission to assess resources and capabilities of competent authority in Uganda in relation to control of pesticide residues; mission provides 10 recommendations; EU demands a comprehensive monitoring programme to determine levels of pesticides and sediments from the lake, but country lacks testing facilities. No laboratories could determine pesticide and heavy metal levels in fish, water and sediments on the lake.
- UNBS responds to EU report but does not provide all requested documentation or details
- A private laboratory is established in Kampala – accredited to perform pesticide monitoring tests
- Industry adopts the 'voluntary code of practice' for quality control; DFR revises inspection manual
- Transfer of competent authority from UNBS to DFR
- July 2000 – ban lifted as the EU accepts guarantees that Uganda had put in required guarantees for safety of exports; country qualifies for temporary certification in List II
- May 2001 – Uganda goes back to List I

Source: adapted and expanded from Waniala (2002: 2)

From 1998, the EU started to place third countries that exported fisheries products in three lists. List I countries could export fishery products to the EU from any establishment approved by the competent authority. List II countries were authorized to export on the basis of a specific list of approved establishments. List III countries were deemed unable to provide guarantees of appropriate inspection and monitoring. In order to export from these countries, additional documentation and checks were needed and only individual establishments approved by the EU could export.

In the early days of Nile perch exports, and even after the implementation of EC regulation 91/493, Ugandan processing plants did not have operational HACCP plans in place. In the pre-BSE period, the EU was not as strict on enforcing food safety standards, and a phase-in period had been granted to third countries (UGF04). There was no organized system of inspections by the competent authority. The first import ban took place in 1997 as a result of reported instances of high bacterial contamination in some Nile perch exports from Lake Victoria to Spain and Italy, including *salmonella*, and was limited to these two countries. The second was imposed for seven months in 1997/98 as a result of an outbreak of cholera in the three riparian countries (plus Mozambique). The third and longest (from April 1999 to July 2000) was initially a self-imposed export ban originated by Uganda that was then turned into a EU import ban that included Tanzania and Kenya as well. In this case, the Uganda competent authority (at that time, the Uganda National Bureau of Standards) had declared that it could not guarantee the safety of fish export following reports of pesticide residues on fish (see details in Box 3; see also Rudaheranwa, Matovi and Musinguzi 2003).

Successive missions carried out by the EU to assess the state of health control and monitoring in Uganda identified a number of problems in the regulatory system that was in place at that time. These missions highlighted that: (1) there was no clear division of labour and responsibilities between the Uganda National Bureau of Standards (UNBS) and the DFR; UNBS was the competent authority and the DFR the inspection body; the two institutions reported to different ministries and had no memorandum of understanding; (2) DFR inspectors could not carry out their duties as they lacked clear guidelines and standard operating procedures; (3) District Fishery Officers did not report to DFR, but to the Ministry of Local Government and did not follow instructions on hygiene and handling procedures; (4) there were no laboratories for the appropriate evaluation of pesticides residues (although 160,000 US$ had been invested in facilities at Government Chemist laboratory); and (5) landing sites did not meet EU requirements; fish handling was unhygienic throughout the chain.

The third ban was finally lifted in July 2000, when Uganda was placed on the EU List II. This was the result, among other changes, of having developed standard operating procedures for the competent authority (DFR), achieved transparency and installed a document control system. This was done in close collaboration with the industry. In 2001, Uganda was placed back on List I (Tanzania was placed in List I in 2000; Kenya in 2004).

The dominant view among Ugandan officials (UGF04; UGF25; UGF26) is that it was reasonable for the EU to guarantee the safety of fish for its consumers. What is felt more problematic was the EU's lack of scientific proof for their claims, which were eventually justified on the basis of faulty systemic performance. In relation to the 'cholera ban', the WHO gave evidence that there was no risk involved in exporting fishery products. Yet, this came too late to undo the damage that the ban had done to the industry. In relation to the 'pesticide ban' the then competent authority (UNBS) misled the EU to believe that you can actually detect pesticide residues in the waters of Lake Victoria. DFR inspectors and several processors claim that thousands of specimens were analyzed and there was never any evidence of residues in the water, sediment or fish. The focus of the bans was on procedural issues, rather than on the safety of the product. It is not economically feasible to use pesticide for fishing Nile perch in deeper waters. The risk of pesticide contamination in the export value chain was basically non-existent. In addition to this, it is actually possible to identify pesticide use in fishing with a simple visual examination. Ugandan authorities had simply been honest (and perhaps naïve) with the EU, asking for time until they solved the situation. They were not expecting a ban, and especially not one that remained in place for over a year. The EU asked for proof that no pesticide residues be present in fish for export. Yet, Uganda needed a laboratory to handle this, which was not available locally. This is when the sector came around asking for a Belgian company to set up a local laboratory.

5.3 CONSEQUENCES OF THE EU BANS

The EU import bans had wide-ranging effects in Uganda. In addition to lower fish exports and loss of export revenue, negative repercussions were felt in fishing communities, among fish processors and related service industries (packaging, transport, etc.). As a result of the bans, three plants closed down completely. The rest worked at 20% capacity and 60-70% of employees were laid off. Three other plants later on changed hands and were rehabilitated (UGFP8).

At the same time, the bans and the feedback provided by the EU missions led to the streamlining of the regulatory and inspection systems, with DFR becoming the sole competent authority in relation to fish safety issues. DFR completely revised its guidelines, monitoring and inspection systems. A manual of standard operating procedures was established to guide inspections. Training programmes were carried out for inspectors. Monitoring procedures at the local level were also put in place, including the formation of committees at landing sites and BMUs, which started carrying out registration of boats and gear (UGF04). At the factory level, assistance was provided for the implementation of HACCP and quality management systems. With EU funding, 14 sites were upgraded to handle fish for export. An internationally accredited private laboratory was established locally, thus avoiding the shipment of samples for testing to Europe. This came at a cost for the industry, as they had to comply with new food safety requirements. HACCP, GMP and GHP compliance necessitated changes in the layout of plants, the establishment of new procedures, training of personnel, and forming of quality control teams. In general, the whole process resulted in enhanced cooperation and closer relations between the regulatory agency and the fish processing industry.

Table 16: HACCP implementation

Company code	HAACP compliant	When started process of HACCP compliance	Number of plants upgraded**	Lenght of process of achieving compliance (months)	Total estimated cumulative expenditure to reach HACCP compliance, capital cost (US$ '000)	Extra recurrent costs (US$/year)*
A	Y	1998	2	12		39600
B	Y	2001	1	12		
C	Y	1997	1	48	1927	65800
D	Y	1997	1	12	1000	
E	Y	2000	1	24		45000
F	Y	1995	1	36		72000
G	Y	1998	2	36	1000	70000
H	Y	1997	1	12	1500	80000
I	Y	2000	1	12	200	43000
Average			11	23	1125	59343

Notes: *estimate includes: product testing, extra QM labour, materials, annual training
** Plants built after 2001 (already to HACCP specifications) not included here

Source: own interviews

Table 16 summarizes the main features of HACCP implementation at the level of processing plants in Uganda. All nine companies and 15 plants are currently HACCP compliant. Except for one company, most started the process of compliance between 1997 and 2000, and took an average of 13 months to successfully complete the process. Total costs of compliance were difficult to estimate. Firstly, some companies were not in the position, or did not wish, to share information on this issue. Second, even those companies which did share information could not always distinguish between costs that were strictly related to the process of HACCP compliance from infrastructure upgrading that was carried out at the same time. As a result, the figures provided in Table 16 on this entry should be taken simply as a rough indicator of a range of costs (between US$ 200,000 to US$ 1,900,000 per plant) that include expansion of plants and truck fleets. It should also be noted that processing plants built after 2000 are designed to be HACCP compliant. The extra costs for a plant to be built to HACCP specification have not been included in the calculations.

Table 17: Structural changes in processing plants as result of achieved HACCP compliance

Company code	built new plant(s) to HACCP specifications	changed layout of factory	built new lab	upgraded lab	changed water supply system	upgraded, rebuilt or expanded storage facilities	changed chilling and/or freezing facilities	upgraded temperature controls	upgraded or changed tables and utensils	rehabilitated/built own landing site	new trucks or upgraded insulation on trucks	expanded and/or improved sanitation facilities, upgrading of machinery, other
A		X			X				X	X		X
B	X	X	X							X		X
C		X	X		X	X	X		X		X	X
D		X	X		X	X	X	X	X	X	X	X
E		X		X			X		X	X		X
F		X	X			X			X	X		X
G	X	X	X		X	X				X	X	X
H	X	X		X	X			X	X			X
I		X			X	X			X		X	X

Source: own interviews

Table 17 specifies the kind of structural changes processors had to undertake to achieve HACCP compliance. All respondents mentioned changing the layout of factories (to break product flows and set up critical control points). Other frequently implemented changes included: building / upgrading own basic laboratories; changing water supply systems; upgrading / rehabilitating storage facilities, tables and utensils; rehabilitating or building own landing sites; upgrading insulation on trucks; and expanding/improving sanitation facilities. Much more precise monetary estimates were provided on extra recurrent costs that each company has to absorb as a result of HACCP-related procedures (see Table 16). These costs include product testing, extra labour costs on quality management, annual employee training, materials and additional management costs. In some companies, these costs are actually grouped under a special 'HACCP budget'. These costs vary from US$ 40,000 to US$ 80,000 per company depending on volumes of fish handled and the size of the dedicated quality management teams (which vary from 5 to 36 employees).[24] Cumulatively, this amounts to a cost of around US$ 540,000 a year for the industry. This represents less than one per cent of the export receipts generated by fish processors (approximately US$ 87 million in 2003).

Processors hold generally positive views on what HACCP has achieved for them. The responses

Table 18: Processors' views on the impact of HACCP on their operations and product quality*

Company code	Response(s)
A	buyers more confident
	lowered production costs
	reduced product loss
	better control of production processes
	product demand increased
B	more confident buyers
C	lower production costs and production losses
	more confident buyers
	lower incidence of product detention at import level
D	buyers more confident in product offered
	lower incidence of complaints
	less risk of rejection
E	more confident buyers
	lower incidence of quality claims
	increased bargaining power (pre-shipment tests) in case of claims
F	more confidence from buyers
G	common language in international markets
	keeps business viable
	more confident buyers
H	
I	eliminated quality problems and claims
	more confident buyers

Note: All respondents mentioned 'restored market access'
Source: Own interviews

[24] These costs were estimated by company rather than by plant because there are overlaps in management and quality assurance labour and training costs within companies.

summarized in Table 18 suggest that the main impacts of HACCP on processors' operations and product quality have been: (1) restored market access to the EU; (2) increased buyer confidence in Nile perch and in Ugandan processing plants; (3) lowered the incidence of quality claims and product seizure; and (4) lowered product loss and production costs.

In short, compliance with EU standards (including HACCP procedures) by the Ugandan fish industry in reaction to the import bans resulted in: (1) streamlined regulation, with a strengthened competent authority that is under one roof (DFR); (2) the formulation of a new fishery policy; (3) improved monitoring and inspection systems, with the drafting of inspection manuals and standard operating procedures and the training of inspectors; (4) regional efforts for the harmonization of handling procedures in the three countries sharing Lake Victoria; (5) upgrading of a (small) number of landing sites and plans for upgrading a substantial number of others; (6) upgrading of processing plants' procedures and layouts; (7) opening up of the US market, which requires HACCP compliance as well; (8) the installation of two local laboratories (at Chemiphar and UNBS) and general improvement of the quality of service provision to the industry; and (9) an increased number of processing plants and improved export performance.

5.4 CRITICAL ISSUES

The Ugandan fish industry has come a long way in terms of fish safety handling and monitoring since the mid-1990s. Yet, a number of critical issues remain. First, monitoring of hygiene and handling practices in Uganda focuses on gazzetted landing sites, where good infrastructure is present and quality management procedures are in place. These sites land only a small proportion of fish caught on the lake. As noted above, most other fish is trans-shipped from other landing sites to gazzetted landing sites, or procured directly at basic sites. All processors interviewed by the author stated that the system of DFR inspections at the plant level is well designed and that inspectors are objective and professional. But they had many more reservations about the professionalism of landing site inspectors and highlighted the lack of critical control points in the trans-shipment points on the islands.

Handling of fish in basic landing sites is still deemed to be generally inadequate. It is done on rudimentary wooden racks and small grass thatched roofs. Fish are often thrown or dragged through contaminated muddy waters, thus bruised. Washing of fish with lake water that is contaminated with human and animal waste increases bacterial contamination. Survey results, based on interviews carried out in 20 landing sites (eleven on the mainland and nine on islands) and covering 507 respondents (Kyangwa, Odgonkara and Nasuna 2002) suggest that these practices

still take place on the Ugandan shores of Lake Victoria. In the past, the quality of the ice used at landing sites also left to be desired, although the situation has apparently improved (NARO 2001: 366-7). The progressive improvement of an increasing number of landing sites will change the sanitary situation on the lakeshore, but given the low number of these sites so far, it will take a relatively long time. Handling during distribution can also cause bruising. Even though trucks that handle Nile perch for export are specifically designed for fish transport, throwing fish in the truck still affects its quality (Kyangwa, Odgonkara and Nasuna 2002: 7-8; see also Namisi 2002).

Second, proper traceability can only be assured at the level of an individual truck delivering to a factory. These trucks can visit several landing sites and are on the road for up to 3-4 days before unloading at the factory. Even from one landing site, they may buy from up to 25 boats that come from 3-4 island landing sites. In short, relatively little is known about the origin of the fish (UGF21). This is not necessarily a problem in terms of EU regulation on traceability, which requires only a 'one-step-back, one-step-forward' system and does not extend to third countries (see Appendix 1). However, it will become more of an issue as fish buyers in Europe (especially supermarket chains) move towards ensuring full traceability. This possibility has led one export / import company to start its own fishing operations by using boats with insulated tops and ice, and long-lining techniques. The company is seeking to assure a constant flow of supplies, full traceability, and that handling is done properly at the catch level. When it comes to export preparation, existing processing companies handle this fish for the company for a fee. The size of this operation and whether it has the political blessing of DFR were not disclosed to the author (UGF21).

Third, monthly inspections to processing plants do not take place with the established frequency, due to lack of resources at DFR. The industry does not pay for inspections and DFR was in the process of negotiating a levy for this purpose in 2004. This would be a reasonable way of solving resource problems at DFR. It would also be a fair system because the levy would be proportional to the value of fish that each processing plant exports. On the other hand, the levy could also establish incentives for under-reporting the value of fish exports.

Fourth, fishery inspectors recognize that the implementation of HACCP has helped processing factories to get their act together, develop better plans, and handle fish more systematically. However, they question whether product testing on all consignments before export is needed as

HACCP is itself a risk-minimizing tool (UGF04).[25] Furthermore, in order to avoid mixing up consignments, this requirement means that Ugandan authorities apply product testing for all destinations, not only the EU (UGF04). EU regulation does not necessarily require product testing (only 'where necessary', see Regulation EC 854/2004; Appendix 1). It certainly does not require product testing on all consignments. There have been no visits from EU inspectors since 2000, and there has been no red alert/product recall ever since from official authorities in the EU. According to one importer, the number of 'private' negative reports concerning food safety in fish consignments has decreased dramatically since 2001. In 2003, the same company had only one complaint from a buyer (UGF31).

If HACCP is functioning properly, and the industry argues that it is, there should be no need for product testing. Processors argue that this practice should be reviewed. At the same time, a key informant stated that although every consignment needs both microbiological and pesticide residue tests, some processors are getting away with carrying out 1-2 pesticide residues tests a month (although they still test each consignment for microbiology) (UGF23). If that is the case, this practice should be extended to the whole industry, rather than allowing some processors but not others to cut costs on testing. According to the same informant, the quality assurance system in Uganda is slowly deteriorating as a result of lack of follow-up visits from the EU after 2000. All factories are under pressure to find ways around mandatory tests, and some have done so. Apparently, testing laboratories are under pressure to be lenient on microbiology tests, and at least one company switched from one laboratory to another because 'results were too bad' (UGF23).

Fifth, in the last few years, factories have been closed down temporarily by DFR when fish safety problems emerged. Due to the fact that the complete set of microbiological results takes five days to be ready, the quality assurance system is run on a recall basis for chilled fish. A key informant, however, claimed that not much happens in terms of recall if a buyer fields a quality claim – normally this is settled with a price discount (UGF23). Although this may be a normal commercial practice, and could even be the rule rather than the exception in fish value chains in general, it

[25] The cost of carrying out these tests is high: microbiological tests cost US$ 52 per sample; pesticide residue tests cost US$ 85 (UGF23). In addition to the tests mandated by Ugandan regulation, some importers have started asking processors for phosphate analysis of export batches. They want to make sure that no phosphate is used to increase the water retention of fish (it adds approximately 10% of water weight). Importers have also started to ask tests on the listeria pathogen as well (UGF33).

still begs the question of why the ritual of establishing and monitoring strict EU standards exists, when a market for sub-standard fish seems to be available anyway. At the same time, better monitoring and documentation systems have allowed Ugandan processors to occasionally counter-act quality claims from European buyers – e.g. by providing proof that temperature surges took place in facilities outside their jurisdiction. The alchemic ritual of systemic verification not only assuages the food contamination fears of European regulators and consumers, it also provides a paper trail for a parallel world of commercial arbitration.

Another aspect of the 'real' fish safety management system is that it seems to be based on an internal and confidential system of redress, rather than the purveyed external and transparent one. Basically, if a problem is found within Uganda, a factory is closed down quietly and the problem is rectified without much fanfare. The argument in the industry is that if problems emerged at one of the factories, and they were reported to the EU authorities, the plant would take at least six months to recover and start exporting again. Thus in practice, if a private buyer in Europe encounters a quality problem on a consignment, this is resolved through private negotiation (and often a price discount) or arbitration. This is a reasonable system considering what happened last time the Ugandan authorities tried to be frank and transparent – the EU imposed a long import ban. One also wonders whether the lack of subsequent inspections by the EU and the accepted wisdom that a small number of upgraded sites handles *all* fish for export are actually actions of willing negligence on the part of the EU – a performative ritual to show its consumers that 'everything is fine in the system'.

6. Other Standards

6.1 ISO 9000

ISO 9000 is a series of standards designed to benchmark quality management systems. They are not designed to cover the quality of the product itself.[26] The first ISO 9000 standard was developed in 1987. At that time, the 9000 series included different standards for design, manufacturing

[26] According to a quality management trainer based in Uganda, if products were certified, the manufacturer could achieve the quality specifications just in the last stage of production, processing or marketing. By carrying out certification on processes, the whole system is covered. In this way, 'a system is put in place that delivers what the customer expects from the business' (UGF29).

and marketing (ISO 9001), manufacturing and marketing only (ISO 9002), and for service providers (ISO 9003). These standards were subsequently modified to make them more generic, open, flexible and applicable to all businesses, which resulted in the ISO 9001:2000 specifications (UGF28).

As of 2004, there were about 500,000 ISO 9001:2000 certified businesses worldwide, 65,000 of which in the US and 5,000 in the UK. In Africa, Uganda ranks second only to South Africa (where there are about 2,500 certified businesses) (UGF28). The first ISO 9000 certification in Uganda was achieved in 1998 by Uganda Batteries. As of 2004, 80-100 companies had been trained and certified against the ISO 9001:2000 standard in the country.[27]

In 2003, all fish processing plants went through the process of ISO 9001:2000 certification through their association – UFPEA. Before this process started, only four plants had already achieved the earlier version ISO 9000 certification. The USAID-funded Support for Private Enterprise Expansion and Development (SPEED) project provided key assistance toward this goal and funded 50% of the total costs of training and certification. According to UFPEA sources, the total cost of training and certification amounted to US$ 47,000 for 8 plants, or approximately UD$ 8,000 per plant. Certification is valid for 3 years, after which a re-certification process takes place. Each year, certified companies are subjected to a surveillance audit. These audits cost US$ 1,400-1,500 per plant (UGF22). Responses from processors (see Table 19) indicate that the costs of compliance were in the range of US$ 2,000-12,500 per company. These costs occurred from their share of training and certification costs, but also from changes in systems of documentation, the setting up of organizational charts and hierarchies, and changes at the upper management levels.

The main steps to achieve ISO 9001:2000 certification are the following (UGF29): (1) preparation of documentation for quality management system; (2) implementation of documented system; and (3) establishment of the organization for certification of the documented system. According one of the trainers who prepared the fish industry for ISO 9001 certification, the task was relatively easy to accomplish once the industry had implemented HACCP in 2000. That meant that a 'culture of quality' had already been established in the industry. However, while

[27] There are two companies focusing on training in quality management system in the country, and two certification agencies.

HACCP takes care of the safety/quality of the product, ISO focuses on management and roles (UGF28). HACCP, for example, would set a temperature range that is acceptable at a critical control point; ISO 9000-inspired systems will make sure that somebody is responsible for setting that range and controlling it, and that a documentation system is in place to monitor it.

According to another quality management trainer, the process of certification has been a good marketing tool for the fish industry in Uganda. It has also improved in-house practices, led to more transparent systems of management, and helped companies to achieve higher degrees of efficiency and effectiveness (UGF29). Interestingly, compliance with ISO 9001:2000 was initiated by the SPEED project, not the industry. Only one of the processors stated in interviews that fish importers had demanded ISO 9001:2000 certification (see Table 19), although four had already been certified against ISO 9000. When asked what were the expected benefits that they expected from ISO certification, a majority mentioned market recognition and an improved image for the industry. Only four companies thought that it made a difference in terms of improving quality management, teamwork, division of roles, and internal communication.

According to the UFPEA strategic plan (UFPEA 2003), the fish industry is now considering ISO 14000 certification, which covers environmental management. According to both quality management trainers interviewed by the author, only three companies had been ISO 14000 certified in Uganda by 2004 (a further two were under training), none in the fish industry. However, a UNIDO-financed programme for 'cleaner production', started in 2001, was in the process of training companies (including three fish processors) on energy conservation, raw material use, cleaner waste disposal, and other environmental issues. It will be easier for these companies to become ISO 14000 certified in the future if they so wish (UGF28). Other fish processors do not have immediate plans to prepare for ISO 14000 certification – most of them do not see the advantage of doing so, or argue that buyers are not interested in it (see Table 19, last column). It would also be more expensive to achieve than ISO 9001:2000 certification, as plants need to be modified, e.g. for appropriate treatment of effluents and waste disposal.

Table 19: ISO 9001:2000 certification

Company code	ISO 9001:2000 certified (2003)	Previously ISO 9000 certified	When ISO 9000 certified	Estimated cost of compliance -- out of pocket expenditure (US$)*	Estimated recurrent yearly costs to maintain certification (US$)	Changes carried out to comply	Expected benefits	Are they considering ISO14000 certification?
A	Y	Y	2002	4000		changes in manuals, forms and records to make HACCP ISO compliant; training	good impression when it's on the website	working on it (UNIDO project on cleaner production)
B	Y	N				training; changes in documentation	market recognition	no
C	Y	N		3800	1500/ plant	changes in documentation; training	market recognition	no
D	Y	N		2000		documentation; training	implemented a holistic quality management system; more comprehensive management	not now, but may become important
E	Y	Y	2001	5000	3000	documentation; set up different organizational charts and hierarchies	better approach to business management; improved organization; better teamwork; set up different organizational charts and hierarchies	they are starting the documentation process; have been involved with UNIDO's project on cleaner production; they have already tackled the affluents, now they are working on a waste treatment plant
F	Y	N		10000		additional documentation; change in operational schemes	buyers like it; better appreciation of each employee's work; better internal communication and management	there is talk in the industry, but buyers have not asked for it
G	Y	Y	2000	10000	2000	combined quality management with HACCP for a more comprehensive approach; changed documentation	good recognition from buyers; better organization and management; redefine roles and formalizing them	started to work on it; they were part of the UNIDO project on cleaner production
H	Y	N		11500	750	changed paperwork	market recognition	no, they do not see the advantage
I	Y	Y	2002	12500	5000	changes at upper level management	some buyers asked for it	no

Source: own interviews

Note: * rest of expenditure was covered by SPEED project (50% of total)

6.2 MARITIME STEWARDSHIP COUNCIL (MSC) CERTIFICATION

The Maritime Stewardship Council (MSC) was established in 1996 as a joint initiative of the World Wildlife Fund for Nature (WWF) and Unilever to address the world-wide decline in fish stocks by awarding 'sustainably-managed' fisheries with a certification and a label that could be affixed to retail products.[28] MSC certification is managed through a chain of custody system that keeps 'sustainable' and 'other' fish separate from each other from catch to supermarket shelf or ice display. In the view of its officers, MSC allows consumers to promote sustainable fishing through a mainly market-based (rather than regulation-based) mechanism.

At the time of writing, there were eleven MSC certified fisheries (the most important of which in terms of volume are South African hake, New Zealand hoki and Alaska pollock) and 19 fisheries undergoing assessment.[29] Once the latter are certified, MSC-certified fish products could represent 4% of global wild edible supply of fish (as a proportion of 2001 global supply), but presently only account for less than one percent.[30] Currently, MSC-certified products have significant commercial presence at the retail level in Switzerland and the UK, with some presence in the Austria, France, and Germany.

As emerged from interviews carried out by the author with MSC officers in London, certification does not seem to be driven by consumers, but rather by supermarket chains and branded processors based in OECD countries which use it as a tool in their 'corporate social responsibility' portfolio. MSC has had some difficulties in gaining consumer recognition and market acceptance in the first few years partly because it did not certify fisheries that could supply the large volumes required by big processors and especially retailers, who want to avoid 'stock-outs'.

MSC certification is granted against a specific standard called the 'Principles and Criteria for Sustainable Fishing', which is structured around three principles: the health of the stock, the integrity

[28] For analyses of MSC, see also Constance and Bonanno (2000) and Gardiner and Viswanathan (2004).

[29] See www.msc.org.

[30] Derived from MSC primary data.

of the ecosystem and the effectiveness of the management system (MSC 2004a).[31] The socio-economic aspects of a fishery fall under the management system principle and include provisions for transparency and involvement of stakeholders, a design that is 'appropriate to the cultural context, scale and intensity of the fishery', the observation of legal and customary rights, and the provision of incentives (economic and social) that contribute to sustainable fishing. In practice MSC's priorities lay in environmental factors, rather than in socio-economic factors (Crosoer, van Sittert and Ponte 2005).

Although MSC has a programme in place to facilitate the certification of developing country fisheries, to date only two fisheries (in Mexico and South Africa) have achieved it – one of which is a large-scale industrial trawling fishery (South African hake). Of the 19 in line for possible future certification, only two fisheries are based in developing countries (Chilean hake and Patagonia scallops). No certification has taken (or is taking) place in LDCs. Uganda is not currently considering MSC certification for Nile perch. Part of the reason is political. According to a senior officer at DFR, 'there should me a more independent body awarding an ecolabel (such as FAO), not an NGO that was funded by Unilever' (UGF04). According to the same source, MSC certification would have to be approached regionally, a politically complex procedure. However, the experience of South African hake certification suggests that this may not be necessarily the case. Hake caught in South Africa is of the same stock of hake caught in Namibia. Yet, only the South African industry is certified (Crosoer, van Sittert and Ponte 2005).

According to another observer (UGF23), sustainability issues are a non-starter in the fish industry in Uganda. President Museveni has publicly disavowed the concept (although he has since backtracked on this, or allowed his policy pronouncements to be reversed). The same observer states that there is no will in the industry either, as factories 'want to squeeze money as fast as possible … [and] nobody cares about sustainability'. Aggravating this situation is the fact that MSC-

[31] Assessment of a fishery is carried out on voluntary basis by third-party certification bodies. The process starts with a confidential pre-assessment, carried out by a certification body for a client or client group. If the results are such that the client decides to go ahead with a full assessment, an expert team is appointed. This team develops performance indicators and scoring guidepoints. Stakeholders can at this point provide feedback on the suitability of these indicators. The fishery is then scored against these indicators, which are aggregated to obtain a score for each of three principles. Depending on the score, a fishery can be rejected, asked to fulfill some pre-conditions before obtaining certification, certified with conditions that need to be addressed within a certain period, or certified with no conditions. Fisheries that are certified are subject to annual audits. After five years, a new assessment has to be carried out (MSC 2004b).

certified fish has not attracted a premium over non-certified fish at the catch and export levels, thus reducing the possible benefits for fishers.

Finally, Lake Victoria has not been seriously considered for MSC certification due to the fact that Nile perch is an introduced species in the lake. Even more problematic is that fact that Nile perch is the main culprit of decreased biodiversity in the lake, thus making it an unlikely candidate for 'sustainability'. At the same time, attempts have been made by one processing factory to spearhead a possible MSC certification process in Lake Albert, where Nile perch is endogenous. This process was still at the early stages at the time of fieldwork.

7. Participation in standards making

In all categories of standards that were covered in this paper, Ugandan stakeholders played no role whatsoever in negotiating their setting or revision. In essence, in relation to fish exports, Uganda is a standard-taker. There are various ways in which a country like Uganda could participate in these processes. For example, ISO is an organization based on member bodies (the national bodies that are 'most representative of standardization in … [their] country').[32] Uganda's member body is UNBS. Member bodies are entitled to participate and exercise full voting rights in technical committees and the policy committee of ISO. In practice, UNBS does not actively participate in technical committees. MSC, when it developed its standard, carried out participatory workshops around the world – but only in developed countries, with the exception of South Africa. Developing countries are having problems in complying with the standard, let alone in influencing its possible revision.

In relation to fish safety standards, EU regulation is supposed to be based on reference standards agreed within the Codex Alimentarius Commission. The Codex 'was created in 1963 by FAO and WHO to develop food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme. The main purposes of this Programme are protecting health of the consumers and ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and non-gov-

[32] See www.iso.ch/iso/en/aboutiso/isomembers/index.html.

ernmental organizations'.[33] Officials from Uganda's DFR attend Codex meetings, even though the Codex contact point is formally UNBS. As highlighted by one of them, however, participation is one thing – effective participation is another (UGF04). This official highlighted how, for example, the Codex fish standards did not contain requirements on organochlorine and pesticide residues; yet, after the EU included these in its standards, it pushed the Codex to apply them too. Inconsistencies arise in relation to the maximum level of mercury in fish as well. It is not clear why certain fisheries (mussels) are allowed higher levels than others (fish). Uganda is able to participate to three international Codex meetings a year, but most standards are formulated by OECD countries, as the competent authorities in Africa cannot afford to send 10 experts each. In addition to this, there is lack of scientific infrastructure in the continent. The plenary meetings basically agree on what was discussed in technical committees and sub-committees, which are normally chaired by OECD countries (UGF04). At the same time, there are positive features in participating to Codex meetings. Africa group Codex meetings are used to share experiences across the continent. Codex is a reference point from which individual countries can draw to set national standards. Participation in codex meetings at least ensures that a country can move with the game in OECD countries and react promptly. In 1991, UNBS did not take new EC regulation on fish safety seriously, so the country lost many years during which it could have upgraded. Now, 'Uganda is part of the game' (UGF04).

8. Concluding remarks

The Nile perch export industry in Uganda has transformed its operations dramatically since the inception of the EU import bans in 1997. Regulations and operating procedures have been put in place to monitor fish quality, at least from a number of upgraded landing sites to the point of export. Processing plants are now HAACP compliant and in the process have upgraded in terms of infrastructure and system operations. They even achieved ISO 9000:2001 certification. The country has started a process of co-management of fishery resources with locally-based 'Beach Management Units'. Exports and foreign exchange earnings have increased to much higher levels than in the period preceding the EU bans. Some processing plants are experimenting with 'value-added' lines. Most plants have started providing new product forms in addition to fillets, such as fillet portions, loins and maws. In general, there has been a much more concerted effort to solve

[33] See www.codexalimentarius.net/web/index_en.jsp.

problems at the industry level in Uganda (and Tanzania) than has been the case in Kenya (see Henson and Mitullah 2004). While Uganda and Tanzania have expanded their capacity and export performance, Kenya's fish industry has contracted.

Is this the happy ending of a story marked by a rebound from an externally-induced crisis? In many respects, the reactions of the fish industry and its regulators to the crisis of 1997-2000, and the ensuing level of collaboration between the two, mark a success story. There has been no major industry shake-out, as only three plants closed down, and a further six were newly installed from 2000 onwards. The industry, albeit fairly concentrated with three players controlling half of the exports by value, is locally-owned and controlled. Price competition at landing sites seems to be healthy, especially in upgraded sites. Employment in the industry, both direct and indirect, has increased. At the catch level, artisanal operations are still the norm, with a majority of fishers owning their own boat or a small number of boats. Although the number of operators that run a large number of fishing boats seem to be increasing, it does not seem to have reached the level of concentration present on the Tanzanian side of Lake Victoria (as depicted in Gibbon 1997).

In a way, the fish industry in Uganda may be currently finding itself where it was in the early 1990s (but partially upgraded), when exports were booming and concerns with EU food safety regulation were not taken seriously. It could be seen as trapped in a well-functioning 'indulgency regime' that is cleverly and cooperatively managed by regulators, industry, and perhaps the EU as well (through active negligence). As a way of conclusion, in the next few paragraphs I will highlight five main problematic issues that may threaten this indulgency regime.

First, many analysts argue that the sustainability of fishery resources on Lake Victoria is in doubt. Yet, there is no conclusive evidence to support these claims, with the exception of a recorded loss of biodiversity in the lake. The only reliable data on Lake Victoria fisheries relate to exports. Information on biomass, fishing effort, and fish population dynamics is fragmented. The dynamics of several fisheries that have collapsed in the last three decades around the world suggest that without appropriate management over-extracted species can disappear commercially in very short periods of time. At the same time, nobody really knows where the balance should be in Uganda between: (1) concerns that high Nile perch stock lowers biodiversity and the long-term sustainability of fisheries; and (2) concerns over the decline of Nile perch stock itself, which would pose serious commercial damage to the export industry.

Measures such as setting reasonable Maximum Sustainable Yields, processing quotas, and limitation of fishing efforts at the beach level have not been seriously implemented, or are just at the beginning of implementation in Uganda. While regional efforts in these realms would be indis-

pensable, cooperation and harmonization of procedures among the three riparian countries has been slow and patchy. Even more worryingly, it is not clear whether such a top-down regulatory approach works at all. Inroads in resource co-management have just started. According to some observers, if badly done, these may just substitute a governmental top-down approach with a donor- and NGO-driven one. In the meanwhile, the fish industry in Uganda, blessed with apparently insatiable international demand for new sources of groundfish, has basically operated on the principle of maximum extraction. Aquaculture, which could release some pressure on wild catches (if properly designed and regulated), is still at a very early stage of development on the lake.

Second, the fish safety management and traceability systems are in practice applied to only half of the Ugandan value chain – from landing site to export. And even in this case, the systems only apply to a very limited number of landing sites. Given the volumes exported, it is unreasonable to expect that all (or even a sizeable proportion of) fish is landed at these sites. Also, it is not clear at all whether the EU itself complies with the food safety system 'by the book' within its boundaries. The problem is that if the EU insisted on effective implementation in the other half of the value chain (from catch to landing site), the very nature of artisanal fishing on Lake Victoria would be in peril. A possible 'second crisis' would result in a very different kind of fish industry at the catch level – one operating larger boats and fleets, more concentrated, and possibly foreign-owned or financed. The implications in terms of employment and incomes for lakeshore communities would be far reaching. There are immense hurdles in applying HACCP principles, Good Hygiene Practices (GHPs) and traceability on fishing boats. Rather than trying to achieve this, the industry and regulators should pressure the EU to allow a special regime that applies to artisanal fisheries. Otherwise, it will be at the mercy of EU oversight (or purposive negligence of the situation) as it is the case currently.

Third, even within the half of the value chain that is apparently functioning properly in terms of food safety management, cracks and inconsistencies are emerging. The quality of landing site inspections is reported to be unsatisfactory. The costs of continuing to test every export consignment are exacting. The export quality assurance system is in theory run on an ex-post recall basis, but in practice is privately based on commercial principles of redress of quality claims (price adjustments), not regulatory ones (seizure of consignments). While this is a reasonable development in view of previous experiences of Uganda with EU food safety authorities, it defies the very principle of risk minimization upon which food safety regulation is based. But again, this situation may not be substantially different than what happens within European boundaries. What seems to be happening at this time is that the alchemic rituals of testing and system verification

are used to keep European consumers and regulators happy – what happens behind the curtain may be quite different.

Fourth, the industry finds itself in a 'catch-22' situation as concerns the size of fillets that is demanded by the market. European demand is for smaller fillets, and even fillet portions that come from smaller fillets. Regulation aimed at sustaining the resource base prohibits the catch of small fish. In absence of harmonized application of this rule in the three riparian countries, it will be difficult to solve this dilemma. Still, it is not clear whether such a regulatory instrument (even when implemented) has an actual impact on sustainability. Aquaculture could provide a partial solution – selling farmed Nile perch of small size would release the pressure over fishing immature wild stock. The influx of low-priced Vietnamese basa in European markets (which yields small fillets) is also a concern for Uganda. However, not too much should be made of what happened in 2003/04. At that time, basa could not be exported to the US as 'catfish', thus inundated the EU market. Exports (as 'basa' instead of 'catfish') to the US have subsequently started again. Also, at least on Southern European palates, Nile perch tastes much better than basa.

Fifth, the general lack of information and disinterest in the fish industry on ecolabelling could also create problems to Uganda in the future. Although the MSC label for the time being covers a small segment of the market, its supply portfolio is growing quickly. Once large European processors can tap on higher volumes, a diversified number of species, and more secure sources of supply of 'sustainable' fish, the uptake of the label in the industry and among consumers could grow quickly. Acting defensively, rather than pro-actively, could cost the industry dear. Being early-entrants in these kinds of initiatives is key. Although the current record of MSC with LDC fisheries certification is abysmal, there is political pressure both within and outside MSC to do something about it. MSC has displayed enough flexibility in some of its certification processes to suggest that the status of Nile perch as an introduced species in Lake Victoria would not create an insurmountable problem. More problematic is that Nile perch as a predator has decreased biodiversity in the lake. However, a case could be made that progressive improvement in monitoring and management of the Nile perch resource in Lake Victoria could actually benefit biodiversity in the lake. In terms of joint resource management systems, the three countries have an institution in place already (LVFO). If reasonable improvements could be documented on implementing harmonized systems for sustainable management of fisheries resources around the lake, MSC certification would not be too difficult to achieve. In order to do this, however, MSC needs to adopt a scoring system that is adjusted to the realities of LDCs, thus radically differing from the one currently in place. What needs to be underlined here is that MSC certification would be likely to lead to improved market access, rather than higher prices for 'sustainable' fish. The extra costs of implementation would have to be absorbed by the three riparian countries. In Lake

Victoria, they would relate mostly to regulatory and monitoring systems, rather than processing plant or fishing operations. Given their environmental preoccupations, it would not seem unreasonable to think that donors could pick up most of the bill.

Uganda's quest of turning fish into gold on Lake Victoria was taken aback by the EU bans in 1997-2000. It is now back, except that there are fears that too much fish is being extracted from the lake to be sustainable in the long-term. The modern-day alchemy of laboratory tests, system performance and 'total quality management' is providing a sense of security to the industry, the EU and its consumers. The allegoric dance of trying to implement minimum fish size regulation *and* supplying the market with much-demanded small fillets, of testing every single export batch *and* assuring systemic performance, and of portraying the existence of a complete HACCP system from boat to aircraft while this actually does not function on the lake, may continue only as long as the EU likes the music. What happens when the music ends and the lights are switched off remains to be seen.

APPENDIX 1: EU FOOD SAFETY REGULATION

The new EU food safety and hygiene framework ('hygiene package') to be in force from 2006 covers all foodstuff from farm-gate to retail (but some requirements are not applied to farms – e.g. HACCP). Special provisions/chapters/annexes apply to fisheries products, by and large coming from older fishery-specific regulations.

The main features of the 'hygiene package' are:

- Third countries need to have health and sanitary regulations that are at least equivalent to the ones required within the EU;
- They need to have competent authorities that can guarantee effective implementation of the relevant regulations through inspection, monitoring and sanctioning systems;
- Business operators need to apply specific sanitary and health practices in catching, handling, processing and packaging fish and fishery products, and a system of risk management based on HACCP.

In the following paragraphs, the main features of individual regulations that make up the 'hygiene package' are laid out.

*Regulation **178/2002***

- Framework regulation forming the basis of new legislation on food safety – establishing basic principles, setting up the European Food Safety Authority (EFSA)
- Sets guidelines for the establishment of a comprehensive system of **traceability** and recall/withdrawal (art. 18)
    - All food businesses need to maintain documentation of suppliers and buyers ('one-step-back, one-step-forward' system) for food and feed
        - Need to know the identity of suppliers/buyers (except for final consumers) and what item/batch has been bought/sold;
        - Need to have appropriate system and procedures in place
    - Risk management tool, does not make food any safer by itself
    - Regulation establishes principles and goals, not how to achieve them; leaves some degree of flexibility to food industry; but measures need to be designed to follow physical movement of product, not only commercial movement
    - Applies to 'any substance intended to be, or expected to be, incorporated into food or feed'; does not apply to veterinary medicine, plant protection products, fertilizers, packaging (covered by other regulations)
    - Internal traceability needed to facilitate targeted and accurate withdrawals
    - Applies to all food business operators at all stages of the value chain, including primary producers and transporters
    - Applies from importer to retail levels in case of products coming from third countries (Art. 11)
        - Exporters are not legally required to fulfil traceability requirements, except in case of special bilateral agreements for sensitive sectors, or where there is a specific EC legal requirement

        - In practice, food businesses may require trading partners to provide traceability information all the way up the value chain in third countries – but this is a matter of contractual obligations, not EC regulation

*Regulation EC **852/2004***

- Sets **general principles of food hygiene practices to be followed by all food businesses** (except for primary producers) and places specific responsibility on them
- Demands the application of HACCP
- Demands registration and/or approval of food businesses with competent authorities
- Does have an extra-territorial dimension (all imported foodstuffs have to comply with EC hygiene standards in their production, processing and handling)

*Regulation EC **853/2004***

- Sets specific **hygiene rules for food of animal origin to be carried out by food businesses**
- In general, does not apply to primary producers; however, it does apply in the case of fisheries products
- Implications for third countries:
    - Establishes a list system of third countries from which imports of products of animal origin are permitted (already in place for fisheries since 1998)
    - General guidelines for approval of third country
        - Legislation, quality of organization of competent authority, inspection
        - General animal health situation
        - Experience in exporting
    - Rules on inspection and audits to be done in a third country by the EU
- Special provisions for fisheries products (Section VIII)
    - Equipment and hygiene conditions on vessels
    - Hygiene during and after landing
    - Hygiene rules for fresh, frozen, processed fisheries products
    - Health standards to be monitored and matched by fishery businesses
    - Rules on wrapping, packaging, storage and transport

*Regulation EC **854/2004***

- Sets rules for **official control of products of animal origin to be carried out by competent authorities** (including in third countries)
- Sets rules for approval of establishments by competent authorities
- General provisions: audits of good hygiene practices (GHPs) and HACCP
- Special provisions for fishery products (Annex III)
    - checks on hygiene conditions at landing and first point of sale
    - inspections of vessels, land-based establishments, storage and transport conditions
    - official controls for fishery products:
        - organoleptic examinations
        - freshness indicators
        - histamine
        - residues and contaminants
        - microbiological checks ('where necessary')
        - parasites

*Regulation EC **882/2004***

- Lays out **EU's duties in the organization of official food and feed controls**, including rules to be applied by competent authorities
- Provisions for the creation of third country lists
    - These countries have to undergo a compulsory EU audit and obtain a veterinary certificate
    - EU inspections can be carried out in non-member countries
    - Frequency of controls appropriate to the level of risk
- Lays out rules to be followed by competent authorities
    - Operational criteria
    - Adequate staffing and equipment
    - Auditing of GHP, GMP and HACCP
    - Effectiveness
    - Impartiality
    - Contingency plans
    - Delegation to non-governmental bodies
    - Transparency
    - Sampling and analysis
    - Pre-export checks from non-member countries
    - Financing of official controls
    - Official and reference laboratories
    - Criteria for certification

Other specific EU food safety regulations that affect fish and fishery products are:

- EC Regulation **91/493** (and amendments) 'Production and placing on the market of fishery products for human consumption' – most provisions are now incorporated in 'general hygiene package
- EU Regulation **466/2001** – sets the maximum limits for heavy metals in a number of species of fish and shellfish
- EU Regulation **2065/2001** on labelling information of fishery and aquaculture products – requires the label to provide information on the trade name of the species, production methods (capture or aquaculture) and country of origin.
- EC Directive **96/23** – sets rules for controlling the residue levels of veterinary medicines (relevant for aquaculture)

Finally, the EU is also developing a legal framework to regulate the development of ecolabels and voluntary certifications, and laying down guidelines for the monitoring of claims.

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