Fish Trade for a Better Future: Risk assessments, listing fish diseases and parasites and capacity building in the Eastern and Southern corridor

WorldFish in partnership with Walimi Fish Farmers Corporative Society

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Prepared by: John K. Walakira (PhD)
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Walakira J.K

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1.0.0 EXECUTIVE SUMMARY

WorldFish is generating information that will guide policy to improve fish trade in the sub-Saharan Africa through the European Union funded *Fish Trade for a Better Future* project. This project aims at improving household food security and reducing poverty by promoting responsible and equitable fish trade and marketing through fisheries and aquaculture initiatives. However, due to recent outbreaks of Trans-Boundary Aquatic Animal Diseases (TAADs) in Africa like Epizootic Ulcerative Syndrome, and lack of efficient and effective aquatic biosecurity control strategies in the region, the fisheries and aquaculture resources are at high risk of economic losses. Therefore, WorldFish seeks to contribute to the regional Aquatic Animal Health Strategy through engagements with its partner the Walimi Fish Farmers Cooperative Society (WAFICOS).

A risk assessment exercise on fish diseases and parasites was conducted in the Eastern corridor (Kenya, Rwanda and Uganda) to understand their potential impact on fish trade in the Sub-Saharan Africa. Information generated will also be used to guide regional policy and regulations for fish trade or fish movements across borders.

Generally, information on movement of fish products (live and processed) across the Eastern corridor borders puts emphasis on locally commonly traded fish species, Tilapia. Preliminary findings from this study indicate: i) the Eastern corridor lacks sufficient mechanism to monitor and manage cross-border movement of potential disease and parasite incidences; ii) No regional policy on aquatic animal health.

This project has generated information through field surveys to determine underlying factors that influence risks of spreading Trans-Boundary Aquatic Animal Diseases (TAADS) and infectious aquatic diseases (including potential zoonotic). It is proposed that capacity building of key stakeholders will engage multi-disciplinary experts to clearly understand factors that influence control of aquatic diseases and parasites in the region. This information has also identified strategies for health management practises and contingency plans that facilitate prevention of spreading aquatic animal diseases. The following recommendations will aim at building an effective biosecurity plan to increase productivity, sustainable management aquatic resources and improve livelihoods of communities.

There is an urgent need to:

1. conduct refresher courses for fish inspectors and other major stakeholders, covering fish diseases detection and mitigation strategies
2. develop a policy guideline on imports of aquaculture inputs especially fish feeds.
3. develop a policy to regulate import of live fish so as to facilitate trade but at the same time control movement of pathogens and parasites
4. develop, streamline and harmonize national and regional policy guidelines on import and export of fish or aquatic products.
5. formulate national and regional policy guidelines for biosecurity and biosafety in aquaculture; and
2.0.0 INTRODUCTION

2.1.0 Background

WorldFish, an international research organization, is partnering with the The African Union Inter-African Bureau for Animal Resources (AU-IBAR) and NEPAD to free Africa from hunger and poverty through development of animal resources that make significant contribution to the region. The Fisheries and aquaculture sector is among the key agricultural value chain that can positively improve livelihoods of vulnerable communities through equitable socio-economic developments; that are underscored in NEPAD’S, CAADP frameworks and the Malabo Declaration. Subsequently, WorldFish is undertaking the implementation of European Union-funded Fish Trade for a Better Future project by conducting research to generate data that will facilitate important policy decisions of the sector.

The State of World Fisheries and Aquaculture report (SOFIA, 2015) indicates that Africa produce about 9.4 million tons of fish: 4.9 million tons from marine capture fisheries (21%); 2.7 million tons from inland freshwater fisheries (11 %); and, 1.4 million tons from aquaculture (5%). However, the per capita fish consumption in Africa is 9.1kg; compared to global level of 18.4kg. Nevertheless, the sector employs about 13 million people with 6.1 million (50 %) engaged in fishing, 5.3 million (42.4 %) processing, and 0.9 million (7.5 %) fish farming. Women contribute 27 percent of the labor supply; 3.6 percent among fishers, processors (58 %), and aquaculture (4 %). Aquaculture in Africa is still developing and producing about US$3 billion per year.

While movement of fish and fishery products through trade helps to improve food and nutrition security, trade may also pose a risk by moving products that are infected and/or infested with diseases and parasite, respectively. This is aggravated by absence of biosecurity strategies at all levels; and this may affect fish production, and quality of fish products. Disease outbreaks cause economic losses and impact negatively on fish trade in Africa (Njagi et al, 2013). Therefore, this study contributes to FishTrade Program’s efforts to improve the capacity of Veterinary Services to implement national and regional policies that minimize spread of aquatic diseases and parasites through fish trade.

2.2.0 Scope of work

2.2.1 Purpose

To strengthen the capacity of Veterinary Services to implement Regional Guidelines and National Policies with the aim of building institutional capacity at national and regional levels to handle aquatic diseases that have direct impact on fish trade.

2.2.2 Specific objectives

a. Undertake pilot risk assessment of disease and parasite of trade importance in the Eastern (Kenya, Rwanda and Uganda) and Southern (Mozambique, South Africa and Zambia) corridors.

b. Assess the status of Competent Authorities (CA) for fish and fish products in selected countries.

c. Undertake and profile fish diseases/pathogens occurring in selected pilot countries.
d. Design and implement a training module for relevant stakeholders.

e. Design a process of harmonization of Veterinary services with regards to fish and fishery products.

f. Develop a road map for rolling out a strategy for strengthening the capacity of Veterinary Services to implement Regional Guidelines and National Policies in line with regional (SADC) and continental (FishGov) frameworks.

3.0.0 METHODS AND MATERIALS

3.1.0 Study area

This study covered major ports (air, water/sea and land) in the Eastern corridor where fish trade is commonly practiced (Figure 1).

Figure 1. Areas covered in this study showing major land-, air- and sea- ports of Eastern corridor where fish trade is important. Fish farms that have exported fish seed to neighboring countries.

3.2.0 Literature review

Secondary data from monographs and other relevant literature revealed key findings on trends in export/import fish products, national disease profiles, existing policies and strategies, and human and infrastructure capacity to handle biosecurity measures. This information underpins efforts to establish or enforce a regional biosecurity strategy, and to build institutional capacity of Member State (MS). Documents reviewed in this study include:

- National Policies (Livestock and Fisheries);
3.3.0 Field Surveys

A survey tool (appendix 1) generated information on commodity and internal risks of fish trade between and within countries of the Eastern corridor. Open-ended interviews were conducted at border points and fish farms, targeting hatchery managers, fisheries officers, customs officers, Chief Veterinary Officers, traders and Researchers resident in the three countries.

4.0.0 Results

4.1.0 Overview of Fish trade in the Eastern Corridors

The expansion and increasing fish trade (informal and formal) in the East African corridors is attributed to the existence of the East African Community (EAC) and Common Market for Eastern and Southern Africa (COMESA). A myriad of fisheries policies has stimulated and increased fish production and economic growth in the region, and responding to increased population.

Uganda continues to dominate the regional export market for fish and fish products, estimated at US$ 162 million in 2013. About 63% of fish exports come from Uganda and are sold to European Union and regional markets. Uganda is the leading fish producer in East African Community (EAC), producing over 410,000t of fish and can potentially produce over 500,000t from capture fisheries and Aquaculture (Figure 2).

![Figure 2. Shares of fish production in the EAC in 2013. Sourced from the East African Community Facts and Figures (2014)](image-url)
Import value from the three countries is still low at 1.2% of the continental value in 2013, with Rwanda entirely depending on imports to meet its national fish demands (Figure 3).

Furthermore, this corridor has a net exporting capacity for live, fresh, chilled or frozen fish products.

Products from Uganda and Kenya contribute to trade surplus among three countries although it has gradually reduced from 2003 to 2013 (Figure 4 & 5). This reduction is mainly attributed to the decline in capture fisheries production. Government initiatives to improve fish production have focused on enforcing fisheries regulations and enhancing aquaculture production. For example, Rwanda has embarked on promoting aquaculture and restocking programs to increase the national fish production.
Capture fisheries contribute over 70% of the fish traded in this region. Exports are dominated by processed and live fish products from commercial species, namely; *Lates niloticus* (Nile perch), *Rastrineobola argentea* (Daaga), *Oreochromis niloticus* (Tilapia), *Clarias sp.*, and *Protopterus aethiopicus* (Lungfish).

4.1.1 Movement of Live materials

Growth and development of aquaculture in the region has accelerated movement of live aquatic materials across and within countries. Live fish exports include Tilapia (*O. niloticus*), African catfish (*Clarias gariepinus*) and mirror carps (*Cyprinus carpio*) seed (fry/fingerlings/juveniles), which are rarely recorded at border points. Uganda exports farmed live fish seed to its neighboring countries mainly through land border points (Table 1).

<table>
<thead>
<tr>
<th>Name of Farm</th>
<th>Species</th>
<th>Av. Weight (g)</th>
<th>Estimated number</th>
<th>District</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>NaFIRRI-ARDC (Public)</td>
<td>Nile tilapia, mirror carps</td>
<td>1-5</td>
<td>30,000</td>
<td>Wakiso</td>
<td>DRC, South Sudan &amp; Kenya</td>
</tr>
<tr>
<td>Rock spring Farms</td>
<td>Nile tilapia</td>
<td>1-3</td>
<td>100,000</td>
<td>Tororo</td>
<td>Kenya, Tanzania &amp; Rwanda</td>
</tr>
<tr>
<td>Aqua-farm Ltd</td>
<td>Nile tilapia</td>
<td>1-3</td>
<td>25,0000</td>
<td>Wakiso</td>
<td>South Sudan, Rwanda &amp; DRC</td>
</tr>
<tr>
<td>Tendo Fish farm</td>
<td>Catfish &amp; Goldfish</td>
<td>1-5</td>
<td>500,000</td>
<td>Wakiso</td>
<td>DRC &amp; Kenya</td>
</tr>
<tr>
<td>Igara Fish Farm</td>
<td>Nile tilapia</td>
<td>1-3</td>
<td>40,000</td>
<td>Bushenyi</td>
<td>DRC &amp; Rwanda, South Sudan &amp;</td>
</tr>
<tr>
<td>Pukure Fish Farm</td>
<td>Nile tilapia &amp;</td>
<td>1-5</td>
<td>35,000</td>
<td>Gulu/Lacor</td>
<td>DRC</td>
</tr>
</tbody>
</table>

Farmers, producers or buyers have direct links to established commercial fish hatcheries, which makes it difficult for responsible authorities to monitor and record movement of live fish within and across country borders. Furthermore, anecdotal
evidence indicates a substantial movement of wild caught live fingerlings/juveniles (catfish and lungfish), used as bait in the Nile perch industry.

The three countries are also importing low volumes of live ornamental fish from Europe, Asia and SADC through international airports (Table 3). Main species that imported include Ornamental fish Angel (*Sterpphyllum scalare*), Oranda gold fish (*Carassius auratus*), Rainbow finfish (*Epalazeorhyncus frenatus*), Tiger barb (*Barbus tetrazona*) and Albino tiger fish (*Pangassius pangassius*). Additionally, Kenya, Rwanda and Uganda have history of exotic introductions of fish species in the region mainly for aquaculture production (food and ornamentals) for example, Chinese carps (*Ctenopharyngdon idella*). However, no information is available to indicate diseases associated with movement of live aquatic materials in the region. Nevertheless, the risk of introducing and spreading infectious pathogens is high since the regional capacity to exclude transmission of potential fish diseases is still low.

4.1.2 List of Aquatic diseases

A list of fish pathogens reported to occur in the region is provided (Table 2). Evidently, agents of TAADS or notifiable diseases are not documented. Recent outbreaks of epizootic ulcerative syndrome (EUS) in Democratic Republic of Congo (DRC) underscore the need to strengthen regional aquatic animal health policies, and institutional capacities.
<table>
<thead>
<tr>
<th>Group</th>
<th>Species</th>
<th>Environment/Location</th>
<th>Host</th>
<th>Country Reported</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CILIOPHORA</strong></td>
<td><em>Apisoma</em> sp.</td>
<td>Freshwater/Fish farms</td>
<td><em>Clarias gariepinus.</em></td>
<td>Uganda</td>
<td>Florio et al. (2009)</td>
</tr>
<tr>
<td></td>
<td><em>Babesiosoma mariae</em> *</td>
<td>Freshwater/Lake Victoria</td>
<td><em>Astatoreochromis alluandi, Labeo victorianus, Oreochromis esculentus, O. niloticus, O. variabilis</em></td>
<td>Uganda</td>
<td>Baker (1960)</td>
</tr>
<tr>
<td></td>
<td><em>Chilodonella</em> sp.</td>
<td>Freshwater/Lake Victoria</td>
<td><em>Oreochromis niloticus</em></td>
<td>Uganda</td>
<td>Fryer (1961)</td>
</tr>
<tr>
<td></td>
<td><em>Coccidia</em> sp.</td>
<td>Freshwater/Reservoirs and Sagana fish farm</td>
<td><em>Oreochromis niloticus</em></td>
<td>Kenya</td>
<td>Florio et al. (2009)</td>
</tr>
<tr>
<td></td>
<td><em>Cryptobia</em> sp.</td>
<td>Freshwater/Reservoirs and Sagana fish farm,</td>
<td><em>Oreochromis niloticus</em></td>
<td>Kenya</td>
<td>Florio et al. (2009)</td>
</tr>
<tr>
<td></td>
<td><em>Epistylis</em> sp.</td>
<td>Freshwater/Fish farms,</td>
<td><em>Clarias gariepinus, Lungfish</em></td>
<td>Uganda</td>
<td>Akoll et al. (2012); Walakira et al. (2014)</td>
</tr>
<tr>
<td></td>
<td><em>Goussia cichlidarum</em></td>
<td>Freshwater/Lakes George and Victoria,</td>
<td><em>Oreochromis niloticus, Sarotherodon galilaeus</em></td>
<td>Uganda</td>
<td>Landsberg and Paperna (1985)</td>
</tr>
<tr>
<td></td>
<td><em>Ichthyobodo</em> sp.</td>
<td>Freshwater/Fish farms</td>
<td><em>Oreochromis niloticus</em></td>
<td>Uganda, Kenya</td>
<td>Florio et al. (2009); NaFIRRI technical report, 2014</td>
</tr>
<tr>
<td></td>
<td><em>Ichthyophthirus multifilis</em>*</td>
<td>Freshwater/Fish farms, Lake Victoria</td>
<td>Barbatus paludinosus, Lebistes reticulatus, Oreochromis niloticus, Clarias gariepinus</td>
<td>Uganda</td>
<td>Paperna (1972); Akoll et al. 2012; Walakira et al 2014</td>
</tr>
<tr>
<td></td>
<td><em>Myxobolus brachysporus</em></td>
<td>Fresh water/Lake Victoria, Oreochromis esculentus, O. variabilis</td>
<td><em>Oreochromis niloticus</em></td>
<td>Uganda</td>
<td>Baker (1963)</td>
</tr>
<tr>
<td></td>
<td><em>Myxobolus heterosporus</em></td>
<td>Freshwater/Lakes George and Victoria, Oreochromis esculentus, O. niloticus</td>
<td><em>O. variabilis</em></td>
<td>Uganda</td>
<td>Baker (1963)</td>
</tr>
<tr>
<td></td>
<td><em>Myxobolus kainjiae</em></td>
<td>Freshwater/ Lake George, H. elegans, Haplochromis angustifrons,</td>
<td><em>O. variabilis</em></td>
<td>Uganda</td>
<td>Paperna (1973a)</td>
</tr>
</tbody>
</table>
### Table 3. Aquatic parasites reported in Eastern Corridor (Conc.)

<table>
<thead>
<tr>
<th>Group</th>
<th>Species</th>
<th>Environment/Location</th>
<th>Host</th>
<th>Country Reported</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CILIOPHORA</strong></td>
<td><em>Myxobolus stenosus</em></td>
<td>Freshwater/Lake Victoria, Lake George</td>
<td><em>Synodontis schall</em></td>
<td>Uganda</td>
<td>Paperna (1973a)</td>
</tr>
<tr>
<td></td>
<td><em>Plistophora</em> sp.</td>
<td>Freshwater/Lake George</td>
<td><em>Haplochromis angustifrons, H. elegans</em></td>
<td>Uganda</td>
<td>Paperna (1996)</td>
</tr>
<tr>
<td></td>
<td><em>Sphaerospora</em> sp.</td>
<td>Freshwater /Fish farms</td>
<td><em>Oreochromis niloticus</em></td>
<td>Uganda, Kenya</td>
<td>Florio et al. (2009)</td>
</tr>
<tr>
<td></td>
<td><em>Trichodina</em> spp.</td>
<td>Freshwater / Fish farms</td>
<td><em>Clarias gariepinus, Oreochromis niloticus, O. esculentus, O. victorinus, O. niloticus</em></td>
<td>Uganda, Kenya</td>
<td>Akoll et al. (2012), Florio et al. (2009); Ogara et al. (1998); Walakira et al. 2014</td>
</tr>
<tr>
<td></td>
<td><em>Trichodinella</em> spp.</td>
<td>Freshwater/ Reservoir</td>
<td><em>Clarias gariepinus, Oreochromis niloticus</em></td>
<td>Uganda, Kenya</td>
<td>Florio et al. (2009)</td>
</tr>
<tr>
<td></td>
<td><em>Trypanosoma mariae</em></td>
<td>Freshwater/ Lakes George and Victoria, Lake George</td>
<td><em>Astatorechomis alluaudi, Labeo victoriana, Oreochromis esculentus, O. niloticus, O. variabilis</em></td>
<td>Uganda</td>
<td>Baker (1960)</td>
</tr>
<tr>
<td></td>
<td><em>Trypanosoma mukasai</em></td>
<td>Lakes George and Uganda</td>
<td><em>Astatorechomis alluaudi, Bagrus docmac, Mormyrus kannume, Oreochromis esculentus, O. niloticus, O. variabilis</em></td>
<td>Uganda</td>
<td>Baker (1960)</td>
</tr>
</tbody>
</table>
### Table 4. Aquatic parasites reported in Eastern Corridor (Conc.)

<table>
<thead>
<tr>
<th>Group</th>
<th>Species</th>
<th>Environment/Location</th>
<th>Host</th>
<th>Country Reported</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PLATYHELMINTHES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monogenea</td>
<td><em>Ancyrocephalus synodontii</em></td>
<td>Freshwater/Lake Victoria</td>
<td>Synodontis victoriae</td>
<td>Uganda</td>
<td>Khali (1971)</td>
</tr>
<tr>
<td></td>
<td><em>Annulotrema elongata</em></td>
<td>Freshwater</td>
<td>Alestes baremoze</td>
<td>Uganda</td>
<td>Khali (1971)</td>
</tr>
<tr>
<td></td>
<td><em>Annulotrema gravis</em></td>
<td>Freshwater</td>
<td>Blycinus nurse</td>
<td>Uganda</td>
<td>Khali (1971)</td>
</tr>
<tr>
<td></td>
<td><em>Characidotrema elongata</em></td>
<td>Freshwater</td>
<td>Blycinus nurse</td>
<td>Uganda</td>
<td>Khali (1971)</td>
</tr>
<tr>
<td></td>
<td><em>Cichlidogyrus arthracanthus</em></td>
<td>Freshwater</td>
<td>Tilapia zilii</td>
<td>Uganda</td>
<td>Khali (1971), Pariselle and Euzet (2009)</td>
</tr>
<tr>
<td></td>
<td><em>Cichlidogyrus dionchus</em></td>
<td>Freshwater/Lake Victoria</td>
<td>Haplochromis guiarti</td>
<td>Uganda</td>
<td>Pariselle and Euzet 2009</td>
</tr>
<tr>
<td></td>
<td><em>Cichlidogyrus halli</em></td>
<td>Freshwater/Lakes George and Albert, fish farm</td>
<td>Oreochromis leucostictus, O. niloticus, Sarotherodon galilaeus</td>
<td>Uganda</td>
<td>Pariselle and Euzet (2009)</td>
</tr>
<tr>
<td></td>
<td><em>Cichlidogyrus longipenis</em></td>
<td>Freshwater/Lake Victoria</td>
<td>Astatoreochromis alluaudi</td>
<td>Uganda</td>
<td>Pariselle and Euzet (2009)</td>
</tr>
<tr>
<td></td>
<td><em>Cichlidogyrus thurstonae</em></td>
<td>Freshwater</td>
<td>Oreochromis esculentus, O. niloticus, O. variabilis, Haplochromis longirostris</td>
<td>Uganda</td>
<td>Pariselle and Euzet (2009)</td>
</tr>
</tbody>
</table>
### Table 5. Aquatic parasites reported in Eastern Corridor (Conc.)

<table>
<thead>
<tr>
<th>Group</th>
<th>Species</th>
<th>Environment/Location</th>
<th>Host</th>
<th>Country Reported</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monogenea (Cont.)</td>
<td>Cichlidogyrus tilapiae</td>
<td>Freshwater/Fish farms</td>
<td>Oreochromis niloticus, Haplochromis macrognathus, Oreochromis leucostictus, O. mossambicus, O. niloticus, Tilapia zillii</td>
<td>Kenya, Uganda</td>
<td>Akoll et al. (2012), Florio et al. (2009); Pariselle and Euzet (2009)</td>
</tr>
<tr>
<td></td>
<td>Diplectanum lacustris</td>
<td>Freshwater/Lake Albert</td>
<td>Lates niloticus</td>
<td>Uganda</td>
<td>Thurston and Paperina (1969)</td>
</tr>
<tr>
<td></td>
<td>Enterogyrus hemihaplochromii</td>
<td>No information</td>
<td>Pseudocrenilabrus multicorlor</td>
<td>East Africa</td>
<td>Pariselle and Euzet (2009)</td>
</tr>
<tr>
<td></td>
<td>Gyrodactylus sp.</td>
<td>Freshwater/Fish farms, Lake Victoria</td>
<td>Tilapia sp, Clarias alluaudi, C. gariepinus, C. werneri, Protopterus aethiopicus</td>
<td>Kenya, Uganda</td>
<td>Paperna (1996); Mwita and Nkwengulila (2008); Walakira et al. 2014</td>
</tr>
<tr>
<td></td>
<td>Macrogyrodactylus congolensis</td>
<td>Fish farms</td>
<td>Clarias gariepinus</td>
<td>Uganda</td>
<td>Akoll et al. (2012)</td>
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<tr>
<td></td>
<td>Neodactylus spinicirrus</td>
<td>No information</td>
<td>Barbus altinalis</td>
<td>Uganda</td>
<td>Khalil (1971)</td>
</tr>
<tr>
<td></td>
<td>Neodiplozoon polycootyles</td>
<td>Freshwater/Streams in Kibale Forest</td>
<td>Barbus neumayeri</td>
<td>Uganda</td>
<td>Chapman et al. (2000)</td>
</tr>
<tr>
<td></td>
<td>Quadriacanthus clariadis</td>
<td>No information</td>
<td>Bagrus docmac, Clarias gariepinus</td>
<td>Uganda</td>
<td>Khalil (1971)</td>
</tr>
<tr>
<td></td>
<td>Schilbetrema acornis</td>
<td>No information</td>
<td>Schilbe mystus</td>
<td>Uganda</td>
<td>Khalil (1971)</td>
</tr>
<tr>
<td></td>
<td>Schilbetrema quadricornis</td>
<td>No information</td>
<td>Schilbe mystus</td>
<td>Uganda</td>
<td>Khalil (1971)</td>
</tr>
<tr>
<td></td>
<td>Scutogyrus gravivaginus</td>
<td>Freshwater/Lakes Victoria &amp; Albert,</td>
<td>Oreochromis leucostictus, O. variabilis</td>
<td>Uganda</td>
<td>Pariselle and Euzet (2009)</td>
</tr>
</tbody>
</table>
### Table 6. Aquatic parasites reported in Eastern Corridor (Conc.)

<table>
<thead>
<tr>
<th>Group</th>
<th>Species</th>
<th>Environment/Location</th>
<th>Host</th>
<th>Country Reported</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digenea</td>
<td>Bolbophorus sp.</td>
<td>Freshwater/Reservoirs and fish farms, Lake Victoria</td>
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<td>Paperna (1996)</td>
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Fish Trade for a Better Future: Risk assessments, listing fish diseases and parasites, and capacity building in the Eastern and Southern corridor

Walakira J.K

Table 7. Aquatic parasites reported in Eastern Corridor (Conc.)

<table>
<thead>
<tr>
<th>Group</th>
<th>Species</th>
<th>Environment/Location</th>
<th>Host</th>
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<td>Paperna (1996); Aloo (2002); Akoll et al. (2012); Walakira et al. 2014</td>
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<td></td>
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<td>Mormyrus sp.</td>
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### Table 8. Aquatic parasites reported in Eastern Corridor (Conc.)

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<th>Environment/Location</th>
<th>Host</th>
<th>Country Reported</th>
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<td><em>Argulus cunningtoni</em></td>
<td>Freshwater/ Lake Albert</td>
<td><em>Auchenoglanis occidentalis, Bagrus bayad, Clarisa gariepinus, Distichodus niloticus, Lates niloticus, Synodontis schall</em></td>
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<td>Mwita and Nkwengulila (2008), Mbandanzireki (1980); Fryer (1965); Benda (1979)</td>
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### Table 9. Aquatic parasites reported in Eastern Corridor (Conc.)

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<th>Environment/Location</th>
<th>Host</th>
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<td>Freshwater/ Lake Turkana</td>
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Table 10. Aquatic parasites reported in Eastern Corridor (Conc.)

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<th>Country Reported</th>
<th>Reference</th>
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<td><em>Oncorhyncus mykiss</em></td>
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<td>Ogara et al. (1998)</td>
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<td>Paperna (1996); Walakira et al. (2014)</td>
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<td>Paperna (1973b)</td>
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</table>

* Mass mortalities reported; ** Pathogen has potential to cause disease outbreaks/mortalities
Cross-sectional field interviews with the fish inspectors and handlers were conducted in the three countries (Kenya, Rwanda and Uganda); and below are the findings.

**ii) Status of Aquatic Animal Disease Patterns and Control Measures at the outlets/borders**

a) An Overview of the site

Fisheries Departments are the main authorities mandated to oversee fisheries activities in the region. Kenya and Uganda have provisions to issue movement permits for live aquatic materials especially farmed fish. However, information to trace the volume and types of movements of live materials is not available in all countries (Appendix 1).

b) Below is a summary of risk factors and determinants for spreading aquatic diseases in Kenya, Rwanda and Uganda:

High likely risks with fisheries traded commodities:

i. Import of live fish illegally poses risk to the aquaculture sector due to the potential and likely introduction of exotic diseases into the country

ii. There is illegal entry of tilapia from China, which is bound to compromise local capacity, as its price is less than the locally produced one; and hence it is in high demand.

iii. Import of fish feeds that is not regulated, bearing in mind that some producers use fish products as inputs in these feeds; and this poses a great risk to the local industry. There are no set guidelines for feed being imported into the country and no laboratory evaluation of safety being performed. Consequently, fish inspectors rely on export permits and certificates from the countries of origin.

iv. There are no facilities for quarantine of imported live fish; and this coupled with general lack of guideline on the same, making the importing countries vulnerable to potential diseases and parasites.

v. Unscrupulous licencing of cage fishing on lake Victoria is a time bomb for all Ugandans as this practice is largely unregulated

vi. Export of visibly sick fish with ulcers particularly from caged fish poses a risk to the countries of destination

vii. No quarantine facilities to hold live fish for an observational period.

Operational Mechanisms and practices to minimize risks of diseases:

✔ There is supposed to be mandatory inspection of all fish entering/leaving the country by fish inspectors. However emphasis is put more on revenue, volumes and no critical examination for diseases is done.

✔ Each consignment of fish is accompanied with a movement permit issued at the source. It should be noted that most traders in table size fish collect fish from more than one farm but at the boarder may declare this fish to be from one source. Therefore, there is a need to ensure that declarations are made on a farm buy farm basis in order to ease with traceability of diseased or fish infested with parasites.

✔ Since we didn’t come across any record of live fish being traded across the border, it is likely that live fish is being traded informally, and hence the movements are not recorded, making tracing of potential diseases and parasites impossible.
In all the entry points visited, it was noted that there was no clear guidelines on the importation of live fish into the countries. Consequently, such borders as Malaba and Busia were simply turn back live fish. The importers in turn opted for illegal routes. Therefore, this calls for the need to design user-friendly policies and guidelines to regulate fish import into the countries.

Currently, Director of Fisheries Resources, issue export permits to traders. Examination of the fish is done before the permit is issued, but this process could not be easily established.

1.1. Disease control strategies.
   1.1.1. At the National level, there is a need for:
   ✓ Issuance of import and export permits
   ✓ Issuance of health certificates
   ✓ Issuance of fish movement permits
   ✓ Fish pathologist to certify fish for human consumption, and
   ✓ Planned disease surveillance both for wild and cultured fish that is routinely performed

1.2. At the Border points, the following observations and recommendations were made.

Observations:
 ✓ No emphasis on fish diseases at border points
 ✓ No set guidelines on import of live fish
 ✓ Fish inspectors not grounded in fish diseases detection and mitigation
 ✓ Fish inspectors not empowered to do their work
 ✓ Too much political interference in the activities of cross-border procedures
 ✓ There seems to be a fall in fish exports from wild catch since November 2015 in Uganda
 ✓ No control of aquaculture inputs
 ✓ Competing interest between biosecurity issues and market forces. The increasing demand for fish products from aquaculture is stimulating movement live materials in the region. Conversely, traders are not willing to declare live aquatic products because of penalties (if any) that may be imposed on their perishable goods.

Recommendations:
 ✓ There is a need to conduct refresher courses for fish inspectors, covering fish diseases detection and mitigation strategies
 ✓ There is a need for a policy guideline on imports of aquaculture inputs especially fish feeds.
 ✓ There is a need for a policy to regulate import of live fish so as to facilitate trade but at the same time control movement of pathogens and parasites
 ✓ There is a need for a policy guideline on import and export of fish in general. Fish in transit ending up as Ugandan export was emphasized upon at Busia border. This illegal importation urgently needs attention
 ✓ There is a need to formulate policy guidelines for Biosecurity and biosafety in aquaculture; and
 ✓ There is a need to emphasize services of fish pathologists so as to improve Biosecurity for both consumers and the fish.
Conclusion

The East African corridor is challenged with regulating movement of live aquatic materials. Consequently, live materials continue to be shipped across borders without proper certification. Furthermore, regional expertise on fish health management is inadequate while the fisheries sector is growing. Coordination on aquatic disease management is minimal or non-existence among and within member states. Therefore, member states will have engage regional bodies like Lake Victoria Fisheries Organization (LVFO) and AU-IBAR to establish mechanisms of controlling trans-boundary infectious fish diseases. This study identifies gaps in policies and management strategies, and recommendations to control fish diseases in Kenya, Rwanda and Uganda. Member states have the mandate to establish an effective regional biosecurity strategy that enhance fish trade but also protect the aquatic biodiversity. Fish trade in East Africa is increasing and dynamic, therefore a regional strategic health plan should be inclusive enough to ensure equity among main actors of the value chain. However, impact can only be realized if the capacity of key stakeholders (i.e. Custom Officers, Veterinary/Fisheries agents, scientists, traders, fish farmers and policy makers) is strengthened and functional. Consequently, healthy fish products can penetrate prime markets (regionally or internationally), which will stimulate or improve production, nutrition and livelihoods.
References


Annexe 1: Survey instrument

FISH TRADE FOR A BETTER FUTURE: RISK ASSESSMENTS, LISTING FISH DISEASES AND PARASITES IN THE EASTERN AND SOUTHERN AFRICA CORRIDOR

Please fill in the blanks

1. Commodity:
   a. List of pest/diseases reported when transporting Live aquatic materials; name of border point, Date:

   For example, “i) EUS, farmed tilapia, Busia, 27th June 2009”

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Fish Trade for a Better Future: Risk assessments, listing fish diseases and parasites, and capacity building in the Eastern and Southern corridor

Walakira J.K

<table>
<thead>
<tr>
<th>Border point</th>
<th>Profile of commodities</th>
<th>Profile of live traded commodities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>processed aquatic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>species</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Av. Volume /yr (tones)</td>
<td>Value/yr (US$)</td>
</tr>
<tr>
<td></td>
<td>(tones)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Species (e.g ornamental s)</td>
<td>Av. Volume/yr (tones)</td>
</tr>
<tr>
<td></td>
<td>Av. Volume/month (tones) *</td>
<td>Volume /yr (tones)</td>
</tr>
</tbody>
</table>

2. National System:
   a) List of existing legislation systems on movement of aquatic animals:

   ....................................................................................................................
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   c. Describe the Transport units, conveyances and packages used transporting aquatic materials:

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Fish Trade for a Better Future: Risk assessments, listing fish diseases and parasites, and capacity building in the Eastern and Southern corridor

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b) Presence and involvement of IT and communication systems?

c) Presence of Quarantine and Health Policy?

d) Presence of registered Importers of aquatic materials?

e) Explain the Involvement of other border agencies:

3. Resources:
   a) Availability of competent staff:
   b) Availability of trainers:
   c) Availability of Laboratories, Post Entry Facilities, Treatment Centres:
4. Governance:

a) Level of compliance and enforcement of the legislation (1-low; 2-moderate, and 3-Good): Explain

b) Presence of Internal and External audits:

c) Stakeholders’ engagement: How often? Implementation plan

d) Sanctions: Availability and implementation strategy
SAFE COMMODITIES verses OTHER COMMODITIES

Quarantine Officers should be aware of the concept of safe commodities and should have a list of safe commodities and other commodities traded through their border post.

Disease-specific measures: Safe Commodities

List of commodities for which, when authorising import or transit, Competent Authorities should require any conditions relating to the disease in question, regardless of the status of the exporting country, zone or compartment for that disease.

Disease-specific measures: Other Commodities

- For all other commodities, a key aspect, which is consistent with the SPS Agreement – is that importing countries should not simply reject a commodity because it is deemed “too risky”.
- Importing countries should assess the risk and try to manage it down to an acceptable level.
- Should follow guidance on disease-specific risk management measures.
  1. All the above depend on the status of the exporting country, zone or compartment for that disease and also take into account the intended end-use for the traded commodity (for example, release into aquaculture, or direct human consumption).
Fish Trade for a Better Future: Risk assessments, listing fish diseases and parasites, and capacity building in the Eastern and Southern corridor

Walakira J.K

Appendix 1

<table>
<thead>
<tr>
<th>Species</th>
<th>Entebbe (in tons)</th>
<th>Busia (tone)</th>
<th>Malaba (tones)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilapia (tones)</td>
<td>316</td>
<td>777</td>
<td></td>
</tr>
<tr>
<td>Nile perch (tones)</td>
<td>8030.4 (frozen)</td>
<td>33 (smoked)</td>
<td>2.9m</td>
</tr>
<tr>
<td>Mukene</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish moulis</td>
<td>510</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 11 Fish imports in Uganda in 2015

<table>
<thead>
<tr>
<th>Species</th>
<th>Entebbe</th>
<th>Busia</th>
<th>Malaba</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilapia (tones)</td>
<td>Unrecorded</td>
<td>Live fish illegally entered</td>
<td>Live fish illegally entered</td>
</tr>
<tr>
<td>Fish heads, tails and maws</td>
<td>114.7</td>
<td>Imported, not documented</td>
<td></td>
</tr>
<tr>
<td>Fish feeds</td>
<td>Not documented</td>
<td>Not documented</td>
<td></td>
</tr>
<tr>
<td>Fishing gear</td>
<td>1.12</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Ornamental fish
Angel (Sterphylum scalare), Oranda gold fish (Carassius auratus), Rainbow fin fish (Epulzeorhynus frenatus), Tigerbarb (Barbus tetrazone), Albino tiger fish (Pangassius pangassius)

Table 12 Fish exports in West, North and Central Zones on Uganda in 2015

<table>
<thead>
<tr>
<th>Boarder post</th>
<th>Species</th>
<th>Volume (kg)</th>
<th>Product form</th>
<th>Reported period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katuna</td>
<td>Mukene</td>
<td>760,800</td>
<td>Sun dried</td>
<td>Oct-Dec,2015</td>
</tr>
<tr>
<td>Mirama</td>
<td>Tilapia</td>
<td>22,700</td>
<td>Fresh farmed tilapia</td>
<td>Oct-Dec,2015</td>
</tr>
<tr>
<td>Mpondwe</td>
<td>Lates, niloticus</td>
<td>1,333,418</td>
<td>0.52-salted byproduct, 0.13-salted whole fish, 0.14-smoked whole fish and the rest is by products</td>
<td>Jan-Dec 2015</td>
</tr>
<tr>
<td></td>
<td>Oreochromis, spp</td>
<td>281,326</td>
<td>0.45-salted whole fish, 0.42-fresh whole fish, 0.1-salted byproduct, the rest covers smoked, sundried and the byproducts</td>
<td>Jan-Dec 2015</td>
</tr>
<tr>
<td></td>
<td>Clarias spp</td>
<td>51,653</td>
<td>0.28-fresh whole fish, 0.51-salted whole fish, the rest is smoked</td>
<td>Jan-Dec 2015</td>
</tr>
<tr>
<td></td>
<td>Protopterus</td>
<td>56,074</td>
<td>0.43-salted whole fish, 0.45-fresh whole fish, rest is smoked</td>
<td>Jan-Dec 2015</td>
</tr>
<tr>
<td></td>
<td>Rastrineobola spp</td>
<td>191,010</td>
<td>Sun dried</td>
<td>Jan-Dec 2015</td>
</tr>
</tbody>
</table>
Fish Trade for a Better Future: Risk assessments, listing fish diseases and parasites, and capacity building in the Eastern and Southern corridor

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No records of live fish and processed fish at boarders of the Western and Northern Uganda. 

c) Movement of live-farmed fish

Fortunately, private and public fish hatcheries sold live farmed fish in 2015 that was exported to neighboring East African countries (Table 5).

Table 13. Summary of farmed fish seed exported from Ugandan Fish farms in 2015

<table>
<thead>
<tr>
<th>Name of Farm</th>
<th>Species</th>
<th>Av. Weight (g)</th>
<th>Estimated number</th>
<th>District</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NaFIRRI-ARDC (Public)</td>
<td>Nile tilapia, mirror carps</td>
<td>1-5</td>
<td>30,000</td>
<td>Wakiso</td>
<td>DRC, South Sudan &amp; Kenya</td>
</tr>
<tr>
<td>2 Rock spring Farms</td>
<td>Nile tilapia</td>
<td>1-3</td>
<td>100,000</td>
<td>Tororo</td>
<td>Kenya, Tanzania &amp; Rwanda</td>
</tr>
<tr>
<td>3 Aqua-farm Ltd</td>
<td>Nile tilapia</td>
<td>1-3</td>
<td>25,000</td>
<td>Wakiso</td>
<td>South Sudan, Rwanda &amp; DRC</td>
</tr>
<tr>
<td>4 Tendo Fish farm</td>
<td>Catfish &amp; Goldfish (ornamentals)</td>
<td>1-5</td>
<td>500,000</td>
<td>Wakiso</td>
<td>DRC &amp; Kenya</td>
</tr>
<tr>
<td>5 Igara Fish Farm</td>
<td>Nile tilapia</td>
<td>1-3</td>
<td>40,000</td>
<td>Bushenyi</td>
<td>DRC &amp; Rwanda</td>
</tr>
<tr>
<td>6 Pukure Fish Farm-Lacor</td>
<td>Nile tilapia &amp;</td>
<td>1-5</td>
<td>35,000</td>
<td>Gulu</td>
<td>South Sudan &amp; DRC</td>
</tr>
</tbody>
</table>

Kyanika

No records

Bunagana

No Records
Fish Trade for a Better Future: Risk assessments, listing fish diseases and parasites, and capacity building in the Eastern and Southern corridor

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Fish Trade for a Better Future: Risk assessments, listing fish diseases and parasites, and capacity building in the Eastern and Southern corridor

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