



Training of National Focal Points for Aquatic Animal Health (Cycle IV)

2 - 4 October 2023 Kigali, Rwanda



Aquatic Disease Situation in Zimbabwe & Reporting of Aquatic Animal Diseases to WAHIS since 2018

2nd to 4th October 2023

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Presentation Outline

- **Background**
- **Overview of Aquaculture production systems in Zimbabwe**
- **Zimbabwe Fish Production trends**
- **Aquatic Biosecurity Initiatives**
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 - **Epidemiology of EUS in Zimbabwe**
- **Country initiatives in addressing AMR**
- **The Tricycle & AGISAR projects**
- **New AMR Governance Structure**
- **Achievements & Challenges**
- **Conclusion**

Background

Zimbabwe is endowed with favourable bio-physical factors for aquaculture development with an estimated >10 000 water bodies

Water resources: Zambezi river to the North, Limpopo river to the South, Inland lakes, dams/ impoundments, rivers and streams

- Lake Harvest Aquaculture- based on Lake Kariba & producing fresh and frozen fish mainly for the domestic and regional markets
- L/ harvest has an EU accredited processing facility producing value added products such as fresh fillets
- Exports of fish products: LHA is exporting mainly to SADC countries, small volumes to Europe, Middle East and Indian Ocean countries
- Lake Harvest tilapia average production/ annum >7.500 MT); production has in recent years been reduced
- Per Capita Fish Consumption in Zimbabwe: 1.2- 3 Kgs
- Zimbabwe produces about 20 000 tons of fish per year, while national potential demand for fish is estimated at 60 000 tons per year; a deficit in supply on current production volumes.

Overview of aquaculture systems in Zimbabwe

- Zimbabwe's Fisheries & Aquaculture Production hinges on 3 fundamentals: Productivity> Animal Health> Marketing (Zimbabwe Fisheries & Aquaculture Resources Development Plan & Strategy Doc)
- Aquatic Animal Health and Fish Disease Management is based on **Biosecurity & the Competent Authority is DVS**
- Fish species farmed in Zimbabwe's fish farming subsector:
 - Nile Tilapia (*Oreochromis niloticus*) (99%)
 - Rainbow Trout (*Onchorhynchus mykiss*) (0.28%)- Trout Farming in Eastern Highlands
 - Other farmed bream species (0.04%); (Green head tilapia, Mozambique tilapia and Longfin tilapia- *Oreochromis macrochir*)

Overview of Aquaculture systems Cont.


- **Production systems:**

- Cage Culture (cages for commercial production e.g. Lake Harvest & Topic Investment on Zhobe Dam in Beitbridge)
- Pond culture- (registered ponds 5634 in 2021 & 7000 in 2022)
- Partial RAS e.g. Finco Bream Farm in Kariba
- Dam mixed culture (Restocking of communal dams for national development programmes)
- Tanks- (concrete, plastic & fibre glass)

- **Future Plans:**

- Increase in fingerling production e.g. by (RADCO Farm & Hatchery in Bindura, Mashonaland Central Province, Topic Investment, LHA & Kariba Bream Farm)
- FISH4ACP/ FAO- Aims at establishing regional fish processing facilities
- Produced a **Tilapia Value Chain upgrading Strategy** - with Biosecurity & AMR as a one of the key activities

ZIMBABWE FISH PRODUCTION

	Volume (MT)	Value (US\$)
Imports	18,900	30.8m
Exports	3,255	8.8m

POPULATION	15.9m
FISH PRODUCTION	Kapenta & wild fish species, Aquaculture: tilapias & other freshwater fishes
IMPORTS	<ul style="list-style-type: none"> •Fish meal, Horse meckerel, Kapenta/Mukene, canned fish •Key sources: RSA, Namibia, Mozambique
EXPORTS	<ul style="list-style-type: none"> •Tilapias •SADC countries, (small volumes of fillets to EU,)
FISH CONSUMPTION RATE	1.2- 3kg

Aquatic Biosecurity Initiatives

- National Aquatic Animal Health Strategy (Draft)
- Biosecurity **checklist** for larger breeders & hatcheries
- Biosecurity guidelines for large & medium to small scale farmers
- Extension materials for Notifiable Diseases i.e Epizootic Ulcerative Syndrome and Tilapia Lake Virus (TILV)
- Extension materials for other economically important fish disease e.g. Saprolegniasis, Sampling for Fish Disease Diagnosis etc.
- **Good Biosecurity in aquaculture reduces AMU & prevents AMR**
- **N/B:- Zimbabwe's Aquaculture production is on a growth trajectory with increased Intensification which may lead to AMU**

Capacity building for AAH

- Training of Veterinarians at National Universities: University of Zimbabwe in Fish Health, Biosecurity and Fish Pathology since 2020
- A proposed new curriculum program at LSU for Bachelor of Science Degree in Freshwater Fisheries Management and Aquaculture Technology within the Wildlife Management program (2021)
- Awareness building through the ZFPA- Fish Diseases component in the basic Manual for Fish Farmers
- A proposed module for training of Fisheries extension officers in the New Department of Fisheries and Aquaculture Resources, MLAFW&RD
- Isolation and confirmation of some fish pathogens at CVL, UZ & Diagnopath Laboratories

Disease Reporting

- Country participation in the WOAHA bi-annual Standards review process- Comments submitted to the Country Delegates on proposed text for adoption in specified chapters of the Aquatic Code & Manual by the Standards Commissions
- EUS was Clinically diagnosed and confirmed in North Shangani Dam, Midlands and Nyaitenga Dam in Mutoko, Mashonaland East province & **the First official report to the OIE- August 2016. No official disease reports made since 2018**
- High to moderate EUS disease prevalence (20%- 90%) was found on inland water bodies (dams & lakes)
- A comprehensive tool for Fisheries Epidemiological data collection and reporting developed & operationalised
- TiLV surveillance sampling & testing is conducted by Lake Harvest and samples sent to International labs- Nil Positive reports recorded so far

1. General

Date of Observation: Type of Observation: Initial Follow up

Attending Officer.....Rat

Outbreak status: Continuing Ended Date ended:

2. Locality

Province: District:

Nearest AHMC: Sampling Location & Ward No:

Owner: Latitude: Longitude:

3. Water Quality

Water Temp. °C: pH: Turbidity: Clear Muddy Green Turbidity:

Submerged Vegetation at Sampling: YES? NO Dissolved O₂: % Conductivity: ms

Dissolved O₂: mg/L Conductivity: ppm

4. Farmed Fish/ Wild Fish

Tick appropriate: Farmed Fish Wild Fish

Species Farmed / Found:

Static Water: Fish Pond Floating Cage
Flowing Water/Lake: Fish Pond Floating Cage Re-Circulated
Pond Substrate: Earth/Muddy Concrete
Source of Farmed Stock: Stock Hatchery From Wild
Import from another Farm Import from another Country
Country/ Farm from where imported:

5. Food source (please tick)

Fertilized Ponds Commercial Feed From Wild

6. Market (please tick where appropriate)

Local Village market: Fish sold live Fish Sold dead/ processed Export: Live Dead / processed
Commercial Processing Plant:

6. Description of Water Body

Stream River Impoundment Lake/Reservoir Swamp Flood Plain **Any Other Diseases/Parasites Noticed:**

Flow/ Water Level: Ebb Average Flood
Average Depth (m):

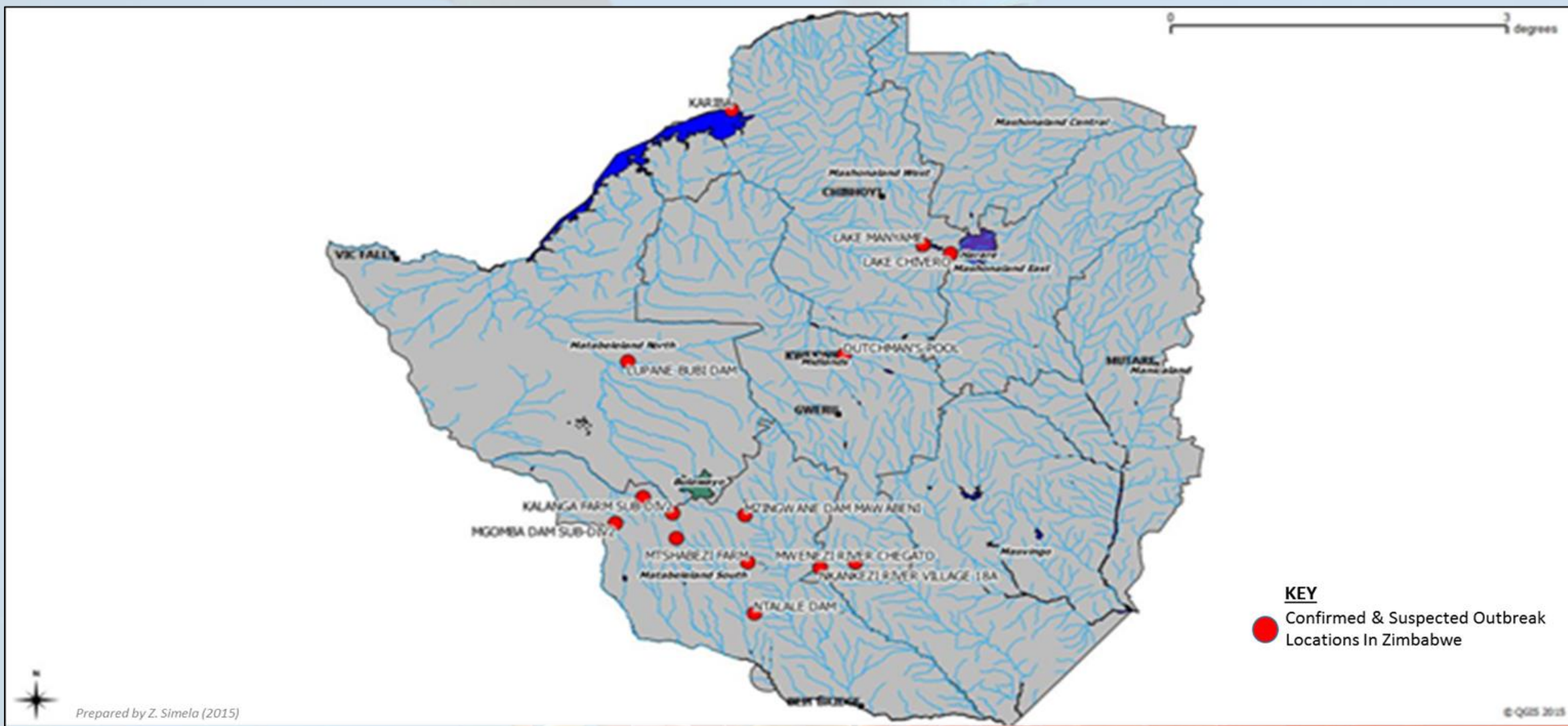
ANY EUS LESIONS: YES NO Number of fish with EUS lesions:

CENSUS: No. of Healthy Fish Examined:

Epidemiology of EUS in Zimbabwe

- EUS is an Emerging Fungal Disease in Southern Africa & is endemic on the ZRB and in Zimbabwe
- First Report of the exotic Disease in Southern Africa was in 2006 on the Chobe Zambezi River System
- First EUS **suspected cases** in Zimbabwe were on Sanyathi Basin, Middle Zambezi & Lake Chivero in 2008
- First EUS **confirmed case**:- 2012 on Darwendale Dam- North- East of Harare (*Gomo et,al.*)
- More suspect & confirmed cases were subsequently recorded from 2013 up to 2017 & the disease remains endemic and sporadically occurring in endemic areas of Zimbabwe

EUS Confirmed & Suspected Outbreaks 2008 - 2015

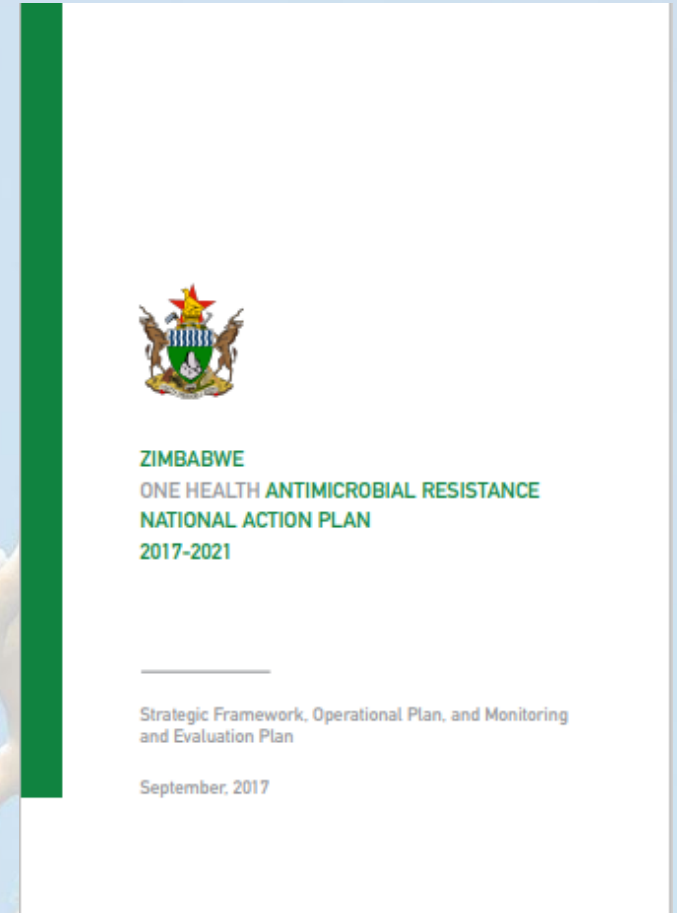


Prepared by Z. Simela (2015)

© OIE 2015

Country initiatives in addressing AMR

- Zimbabwe developed the first AMR One-Health National Action Plan (NAP) in 2017 for the 2017-2021 period
- A 2nd NAP for the 2023-2027 period is under review
- NAPs provide a framework of sequence of actions to align activities of different stakeholders in different sectors toward one large goal of mitigating AMR within the One Health Concept of the Quadripartite



The Tricycle project

WHO integrated global surveillance on ESBL-producing E. coli using a “One Health” approach, “The Tricycle Project”: 2021-2022

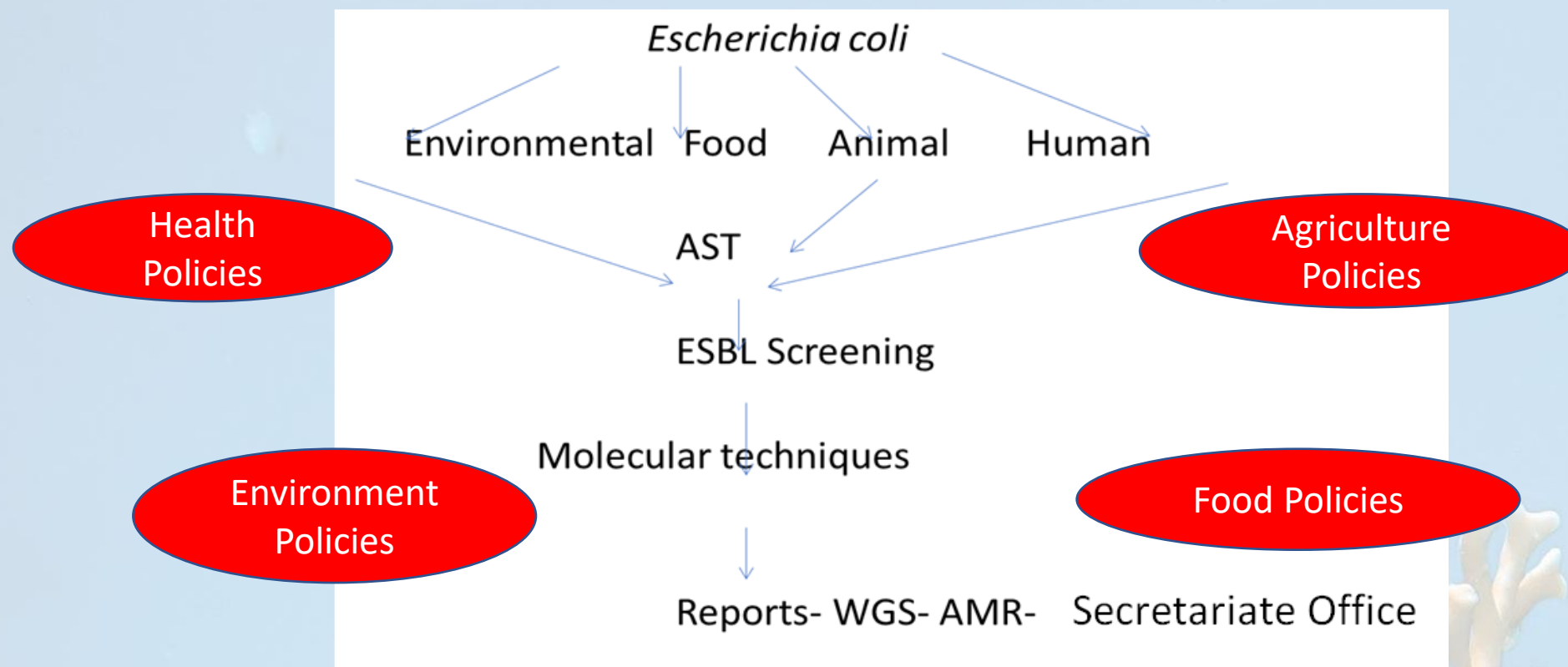
- ESBL producing E. coli was found in Zimbabwe's One Health sector
- Human prevalence was unclear due to poor isolation techniques
- 65.7% of animal sector samples confirmed as ESBL- E. coli producers
- ESBL producing E. coli common in aquatic environment
- Poultry slaughterhouses major source of contamination
- **Challenges:** reagent shortages, poor sample quality, farm owner hesitancy

The AGISAR project

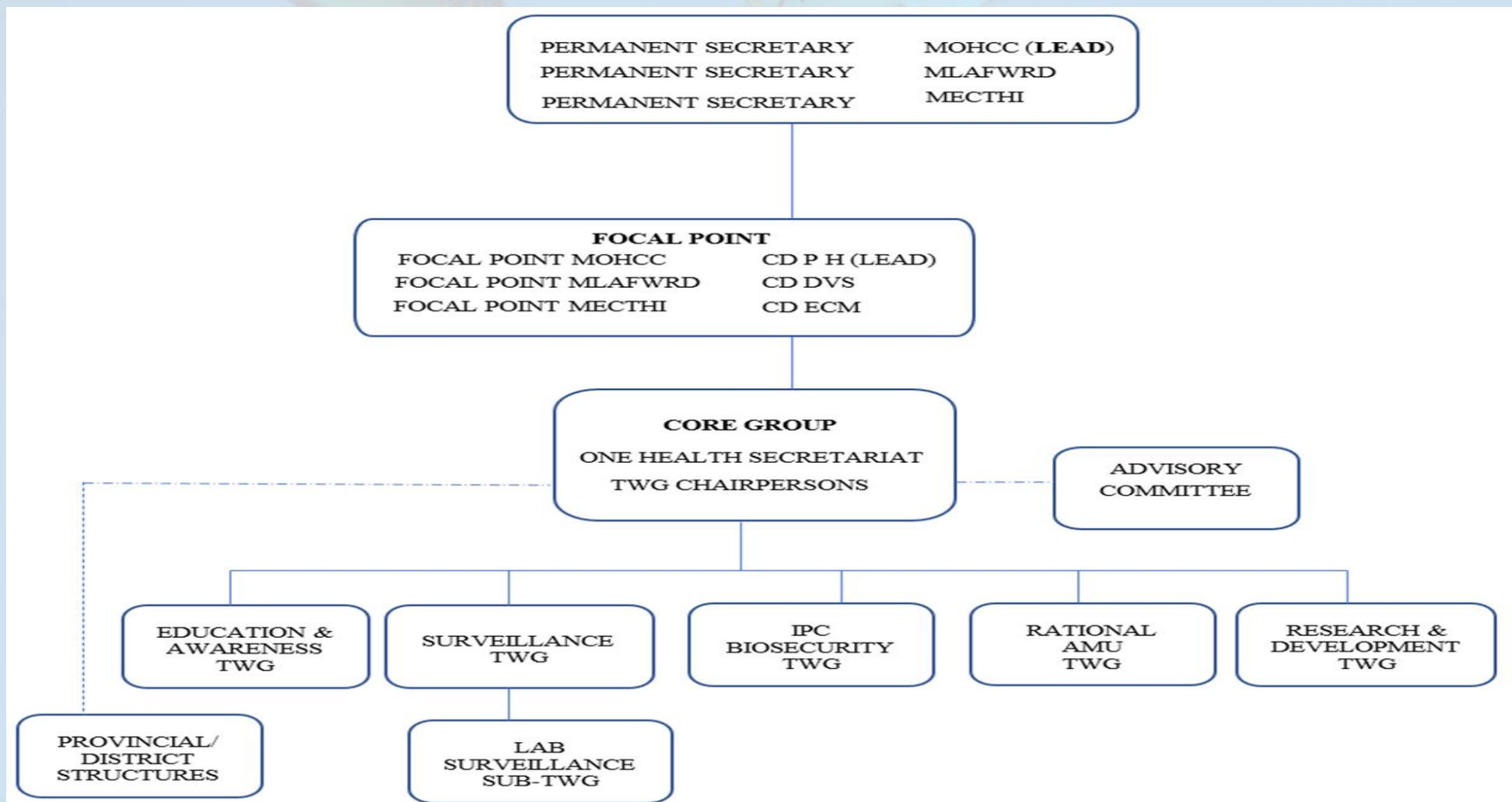
AGISAR integrated foodborne antimicrobial resistance laboratory surveillance system in Zimbabwe.

- Provides insights into the surveillance of antimicrobial resistance in humans, the environment, and the food chain.
- The AGISAR Report presents AMR surveillance results in humans, animals, and food in Zimbabwe (2017-April 2019)
- Main drivers of resistance: food chain sector, human health sector, and environment
- Common resistant bacteria in food sector: Salmonella spp. and Campylobacter spp.
- Common resistant bacteria in animal sector: Escherichia coli and Enterococcus spp.
- Common resistant bacteria in human sector: Escherichia coli, Klebsiella pneumoniae, and Staphylococcus aureus
- **Recommendations:** strengthening of lab capacity, improve data management and analysis, promotion of rational antimicrobial use in all sectors.

Escherichia coli analysis- A One health Approach



New AMR Governance Structure




Achievements & Challenges in AAH

- Improved collaboration of WOAHA Focal points for AAH, AMR and MCAZ- focal point for Medical Products
- Successful facilitation by DVS of the Importation by Lake Harvest (LHA) of **New Broodstock** of Nile Tilapia (*Oreochromis niloticus*), the improve GIFT strain from Benchmark Genetics USA trading as Springs Genetics in Miami, Florida, USA- October 2020
- FISH4ACP/ FAO- a **Tilapia Value Chain upgrading Strategy**- Documented Value Chain & the Situational analysis, BSF Project with CUT- alternative protein source for fish feed production
- **Zimbabwe Fisheries & Aquaculture Resources Development Plan & Strategy Doc**
- A research project funded by CIRAD on: 'The Epidemiology of EUS on TFCAs in Zimbabwe: Implications on Human Livelihoods and the Aquatic Environment'



ORIGINAL ARTICLE

Emergence of infection with *Aphanomyces invadans* in fish in some main aquatic ecosystems in Zimbabwe: A threat to national fisheries production

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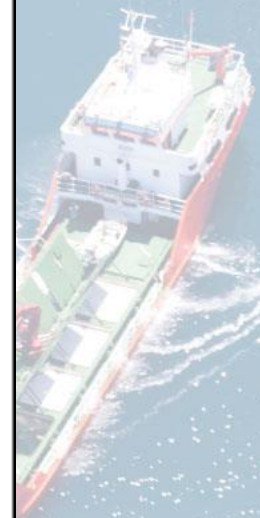
Gift Matope, Department of Paraclinical Veterinary Studies, Faculty of Veterinary Science, University of Zimbabwe, PO Box MP 167, Mount Pleasant, Harare, Zimbabwe.
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Abstract

The first outbreak on the African continent of infection with *Aphanomyces invadans* (the causative agent of epizootic ulcerative syndrome) in fish was confirmed in the Chobe-Zambezi rivers in 2007. The emergence of massive outbreaks of infection with *A. invadans* in multiple fish species exposed serious aquatic biosecurity challenges in the Southern African region. This study investigated the incursion of infection with *A. invadans* in fish from the main aquatic ecosystems of Zimbabwe from 2012 to 2015 using data obtained from the Department of Livestock and Veterinary Services, Zimbabwe. In some outbreaks, fish samples were collected and tested at the University of Zambia, for confirmation by histopathology and species-specific PCR. The infection was first confirmed at Darwendale water impoundment (Mashonaland West Province) in 2012, followed by Matabeleland South Province at Mtshabezi water impoundment and Nkankezi River (both 2013). An apparent southward spread continued in 2014, with virgin outbreaks at Ntalale water impoundment (Matabeleland South Province) and Mwenezi River in Midlands Province. In 2015, inland incursion was confirmed at Dutchman's Pool in Midlands Province and further north-west at the Sanyati River Basin in Lake Kariba (Mashonaland West Province). In all outbreaks, infection with *A. invadans* was confirmed in seven fish species, namely the African sharptooth catfish (*Clarias gariepinus*, Burchell, 1822), blunt-toothed African catfish (*Clarias ngamensis* Castelnau, 1861), yellow belly bream (*Serranochromis robustus* Gunther, 1864), straight fin barb (*Enteromius paludinosus* Peters, 1852), dashtail barb (*Enteromius poechii* Steindachner, 1911), large-mouth bass (*Micropterus salmoides* Lac'ep'e'de, 1802) and the three-spot tilapia (*Oreochromis andersonii* Castelnau, 1861). Cases were most common in the African sharptooth catfish, with mortalities more pronounced in young fish of all species. The results suggested a gradual emergence of an intractable infection with *A. invadans* in fish in the main aquatic ecosystems of Zimbabwe, which may have negative impact on biodiversity conservation and aquaculture.

KEYWORDS


emergence, epizootic ulcerative syndrome, fish, Zimbabwe





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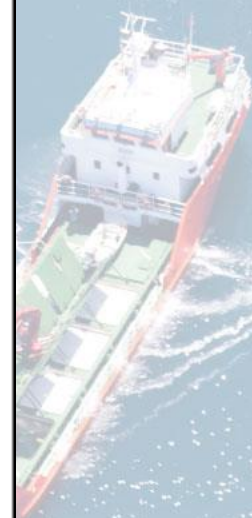
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Achievements & Challenges Cont.

- Improved diagnostic capacity to provide surveillance data on Aquatic Animal Diseases using standardized diagnostic methods/ tests to improve disease reporting, and to aid decision making- work at CVL, UZ & Diagnopath laboratories
- A need for: –
- - Enhanced national AAD surveillance, control and monitoring for WOAHA notifiable and non-notifiable aquatic diseases of economic interest
- - Enhanced control of domestic movement of live aquatic animals and other domestic activities that may spread pathogens
- - Legislative review and strategies for imports and exports of fish, fish products, and ornamental fish; and prevention of illegal fish importation
- - Shared regional disease control strategies to prevent transboundary diseases which remain a threat to sensitive aquatic systems throughout Africa.

Achievements in AMR

- Human, animal, environment sectors WAAW commemoration through journalists & media
- Ongoing antimicrobial use monitoring activities- information from all sectors - human, animal (including at farm level), agriculture/plant (including at farm level), environment yet to provide data
- TrACSS, WOAHA animal consumption data through MCAZ and WHO human consumption data through DPS
- Pilot on farm use (AMU) through FAO Farmer Field School
- Point Prevalence Surveys on antimicrobial use conducted in hospitals (2019, 2021, 2023)
- EML is part of Guidelines -EDLIZ -2020 version (Essential Medicines List and Standard Treatment Guidelines for Zimbabwe reviewed)-Reviewed every 4 years with Addendums when necessary.

CONCLUSION

- Prioritization of AAD Surveillance and IM to better position certifying authorities to certify health status for trade in Fish & Fish products and to facilitate decision making
- Environmental challenges require attention including multiple water use strategies and technologies for increased Aquaculture Production
- Increased research into aquatic animal diseases & problem areas is required e.g. on climatic change, environmental risks factors, pollution, AMR, fish seed and feed production etc.
- Need for a Sustainable Rural Aquaculture Models for Zimbabwe
- & Improved capacitation of Aquatic Health personnel and **hopes are underpinned on the RAAHN.**



Thank You