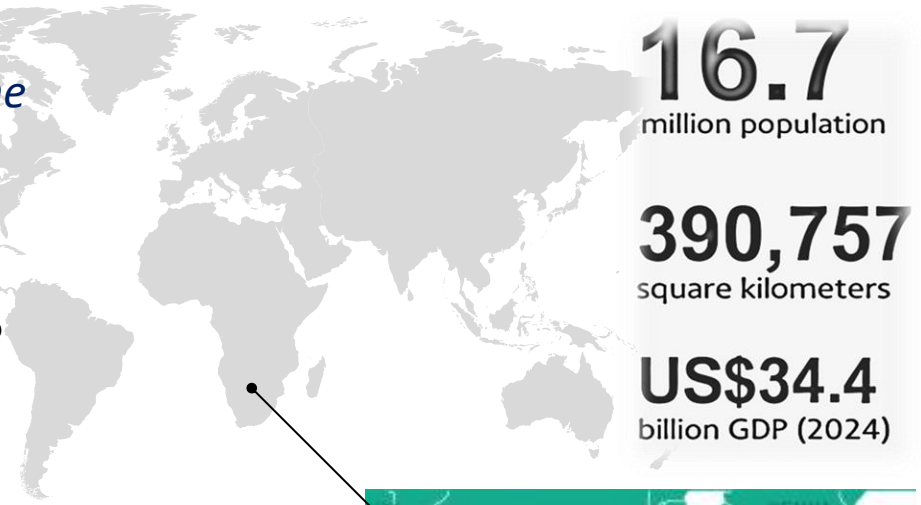
The current status of Aquaculture and Antimicrobial Resistance(AMR) in Aquaculture Farming in Zimbabwe

Tinashe, Lorraine and Robert

Zimbabwe Country Profile

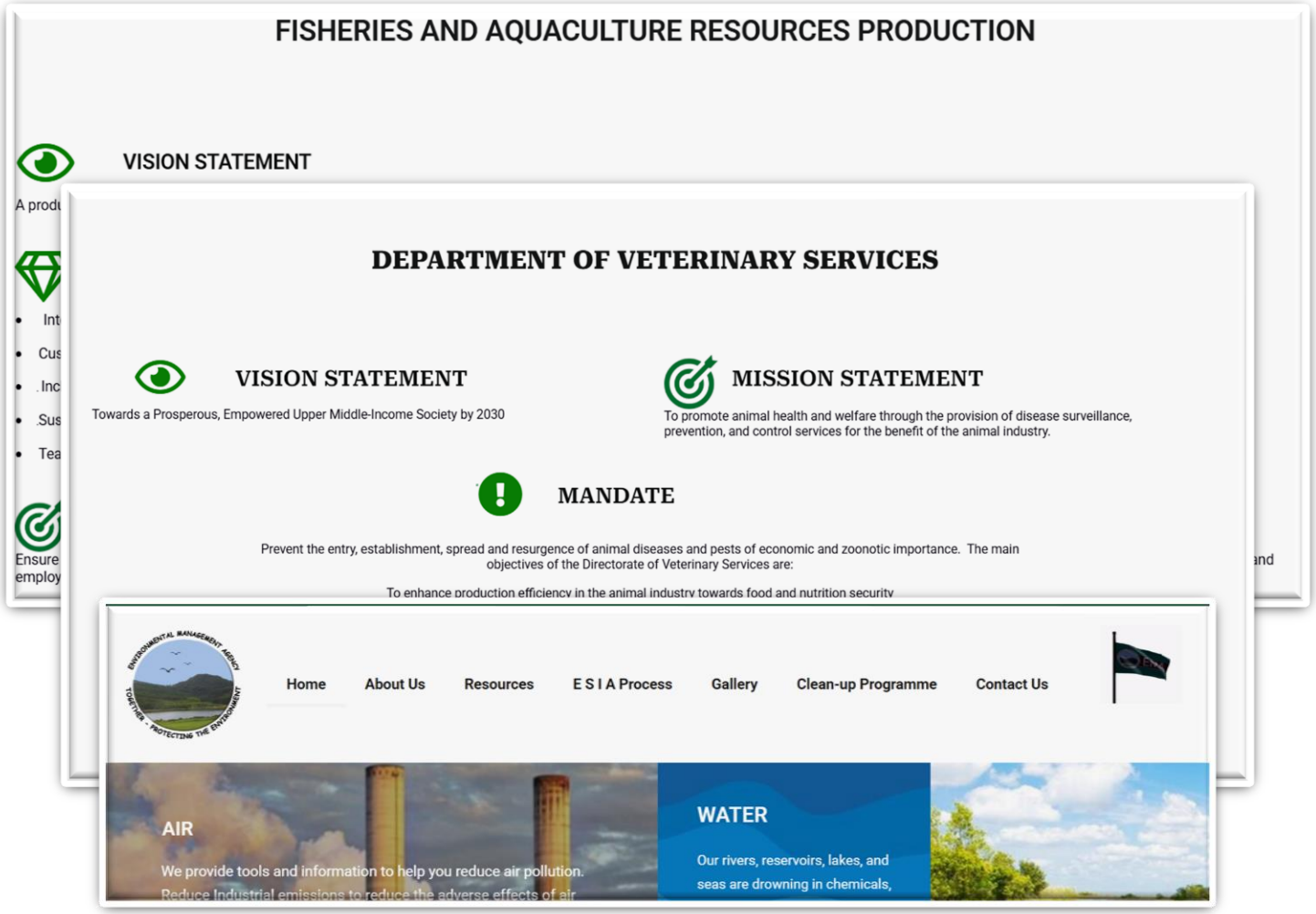
- Zimbabwe is a Southern Africa **land-linked** country.
- *Zimbabwe is home to various ethnic groups, including the Shona and Ndebele.*
- *Harare serves as the political and economic capital.*
- The agricultural sector contributes 13% of the GDP.
- Agriculture remains the largest employer engaging >50% of the workforce and supporting livelihoods.



Key Agricultural Outputs

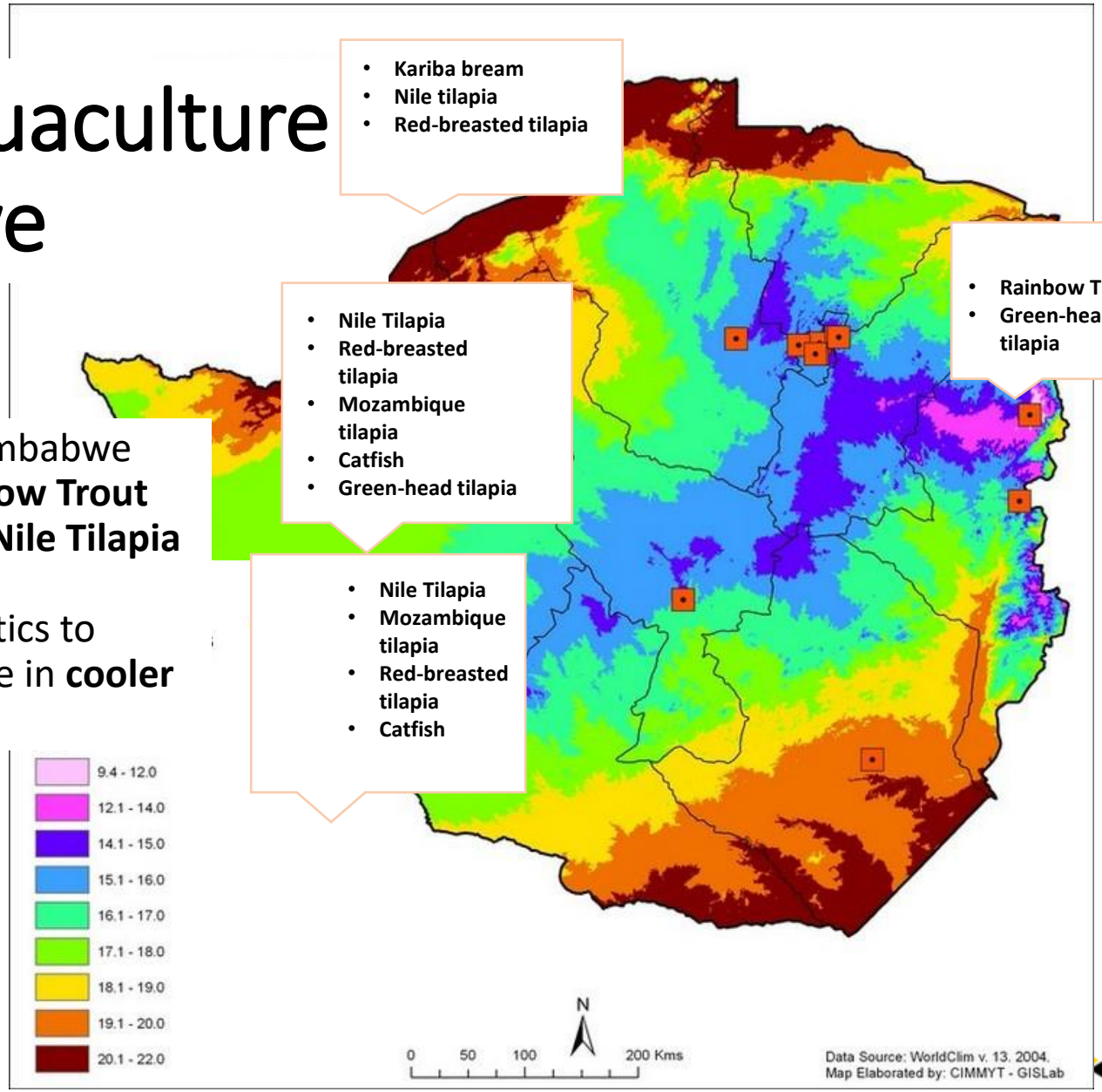
- Largest producer of tobacco in Africa (33% of total production) and among the top 5 globally.
- Maize cultivation vital for domestic and food security in excess of 300Mil MT.
- One (1) of two (2) wheat self sufficient countries in Africa
- Cotton farming key in rural livelihood and textile service support.
- Horticulture - export particularly to the European Market e.g. Zim. largest Blueberry producer
- *The fisheries and aquaculture sector currently contributes 1.8% to the country's GDP.*

KEY STAKEHOLDERS



State of Aquaculture in Zimbabwe

- The map shows **temperature ranges** across Zimbabwe
- **Eastern Highlands:** Coldest; suitable for **Rainbow Trout**
- **Warmer low veld & central regions:** Ideal for **Nile Tilapia & Redbreast Tilapia**
- Ongoing research aims to match existing genetics to production environments **e.g.** *O. macrochir* use in **cooler zones**



Temperature Ranges of Zimbabwe

Overview of Aquaculture Production Systems

- Zimbabwe has an estimated 10,700 dams covering 3,910km^2 with **159 fish species**.
- Fish production is reliant on **Aquaculture (16%)** and **Capture Fisheries (84%) -** major lakes, dams, and reservoirs (particularly Kariba).
- **Dominant aquaculture production system:** Pond production. **Others inc.** cages, raceways, recirculating aquaculture systems (RAS), tarpaulin tanks, integrated aquaculture

Overview of Aquaculture Production Systems

- *Oreochromis niloticus* (Nile tilapia) dominates the sector, accounting for ≥90% of production per annum in aquaculture.
- Other species include: *Oreochromis macrochir, Copton rendalli, Oreochromis mossambicus, Orrhyncus mykiss, Oreochromis andersonii,* and *Clarias garipienus.*
- National potential demand for fish is 60,000 tons per year.
- The estimated annual per capita fish consumption level is at 3.72kgperson^{-1}
- **Estimated Annual Production**: 31,000MT per annum (total) 5,689.75MT **av. aquaculture** with **4,942.75MT in 2024**
- **Number of Aquaculture Farms/Producers (approximate):** 7,458 farmers (inc. 13 crocodile, 7 trout and the rest being tilapia and catfish farmers practicing multi-species rearing).

Overview of Aquaculture Production Systems

Production output in the last five years for major species cultured

Fish Species	2023/24 (MT)	2022/23 (MT)	2021/22 (MT)	2020/21 (MT)	% Change 2023/24
Nile tilapia	4,800	6,704	4,949	5,803	-32
Red-breasted bream	10	12	9	8	-17
Mozambique bream	7	6	9	8	+33
African catfish	139	48	56	46	+188
Rainbow trout	30	36	35	44	-16
Total	4,986	6,806	5,058	5,909	-27

Peak Production: 10,510 MT (2015/16)

Recovery: 6,806 MT (2022/23), up **35%**

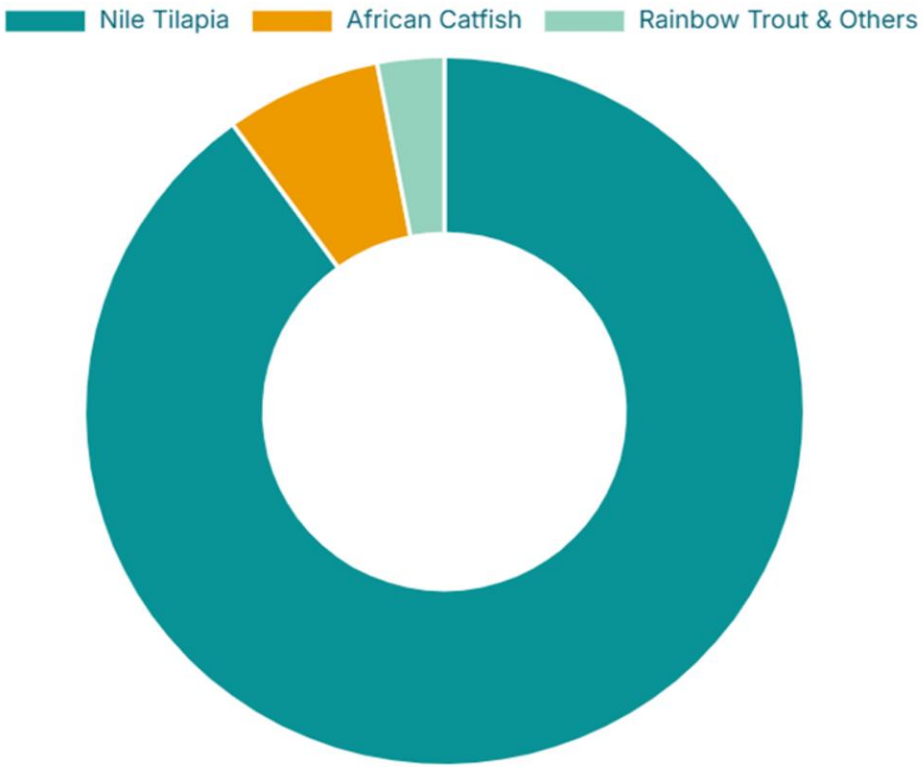
Decline: 4,986MT (2023/24), impact of El Nino induced drought

Growth linked to **pond culture promotion** and **government support (Tilapia Value Chain Analysis??)**

Challenges persist, impacting long-term stability

Farmed Species Composition

The industry is overwhelmingly dominated by a single species, increasing risks from species-specific diseases.



35,000

Metric Tons

Annual national fish deficit driving production pressure.

>90%

of Production

Is Nile Tilapia, creating a monoculture vulnerability to disease.

AQUACULTURE SECTOR CHALLENGES

High Feed Cost For Quality Fish Feed

Low Fish Consumption Tradition

Inadequate funding

Weak Research and Development

Lack of Enabling Legal Framework

Lack Of Access To High Quality Fingerlings And Fish Feed

Limited Cold Chain and Processing Facilities

Government Interventions

- The Government of Zimbabwe has implemented initiatives to promote fisheries and aquaculture development.
- **Flagship programmes under Rural Development 8.0 (RD 8.0)**
  - **Presidential Community Fisheries Scheme (dam stocking, fingerling distribution)**
  - **Presidential Borehole Drilling Schemes**

- Focus on **VBUs, YBUs, and SBUs** to boost fish production
- Target: **35,000 villages** with **drilled boreholes** nationwide
- Each site to have **2 commercially viable fishponds (200m^2)**
- Leverages Zimbabwe's **abundant (underground) water resources**

Progress since implementation (2022 – 2025)

Business Unit	No. Ponds Stocked
Village Business Unit (VBU)	1,439
School Business Unit (SBU)	30
Youth Business Unit (YBU)	30
Vocational Training Centre (VTC)	3
Total	**1,502**

Public Private Partnerships

- FAO
- WORLDFISH, ENABLE TAAT, FORUM FOR AGRICULTURAL RESEARCH IN AFRICA (FARA
- UNIDO, WWF, ARSO, FAO, SADC SECRETARIATAU-IBAR

- Fish4ACP Countries Project
- Technical Support To Enhance Fish Breeding and Production In Zimbabwe
- Technical Assistance For Agricultural Transformation In Countries In Transition Project (TSF)
- Programme For Improving Fisheries Governance And Blue Economy Trade Corridors In SADC Region (Profishblue)
- National Blue Economy Strategy Development

FISH4ACP Countries Project

- **Fish4ACP Countries Project**
- **Technical Support To Enhance Fish Breeding and Production In Zimbabwe**
- **Technical Assistance For Agricultural Transformation In Countries In Transition Project (TSF)**
- **Programme For Improving Fisheries Governance And Blue Economy Trade Corridors In SADC Region (Profishblue)**
- **National Blue Economy Strategy Development**

Technical Support To Enhance Fish Breeding And Production In Zimbabwe

- Development Of National Hatchery Management Guidelines
- Establishment of three (3) government breeding sites (Henderson, Matopos and Makoholi fish breeeding sites)
- Aquaculture Frame Survey
- Fingerling Distribution Hubs
- Alternative Fish Feed Production (Black Soldier Fly Production)
- Breeding And Propagation Of Green-headed Tilapia To Trial The Species For Commercial Production
- Fisheries And Aquaculture Bill Development

Food and Agriculture Organization of the United Nations

Discover

English

Home > News and Stories > News detail

FAO Regional Office for Africa

About us | **News and Stories** | Events | Regional Priorities | Projects | Resources | Partners

FAO, Government partner to tackle aquaculture challenges in Zimbabwe

By addressing these challenges, the initiative paves the way for a thriving, sustainable, and resilient aquaculture industry that can contribute to the country's food security, economic growth, and environmental sustainability.

African Researchers Magazine
ISSN: 2714-2787

African Researchers
#1 African academic research magazine | .. Promoting African Research
www.africanresearchers.org ISSN: 2714-2787

RESEARCH PAPERS

How Aquaculture is Transforming Rural Livelihoods in Zimbabwe: A Case Study of Seke Rural District

Fish Farming: The Game-Changer for Rural Communities in Zimbabwe 🌱🐟
#SustainableLivelihoods #Aquaculture

About The Author

AR Managing Editor

African Researchers Magazine (ISSN: 2714-2787) - your premier source for latest African research, science and scholarly news

Institute for Young Women Development (IYWD)

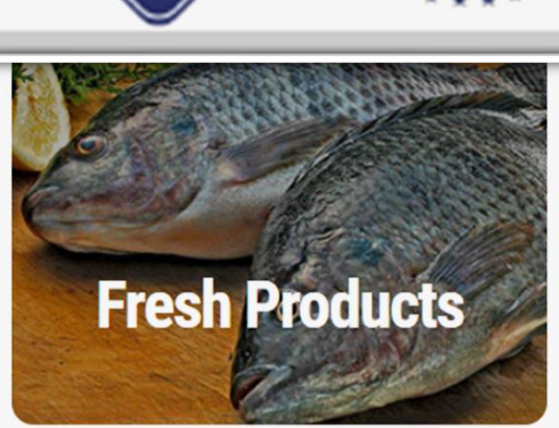
@instituteforyoungwomendeve2684 · 879 subscribers · 90 videos

Institute for Young Women Development (IYWD) is a non-governmental organization whic ...more

Subscribe

Lake Harvest

Celebrating 25 years



surrey group
Surrey Group

WOAH Regional workshop on Antimicrobial Resistance in Aquaculture for English speaking African Countries
Rainbow towers, Harare Zimbabwe
12-16 August 2025

Technical Assistance For Agricultural Transformation In Countries In Transition Project (TSF)

- Farmer Capacitation African Catfish Seed Production **Worldfish**
- Farmer Capacitatin In High Quality Low Cost Fish Feed Production **Worldfish**
- Establishment Of Innovation Platforms **FARA**
- Youth Training In Agribusiness **Enable TAAT**

Profishblue Project

Implementation To Date

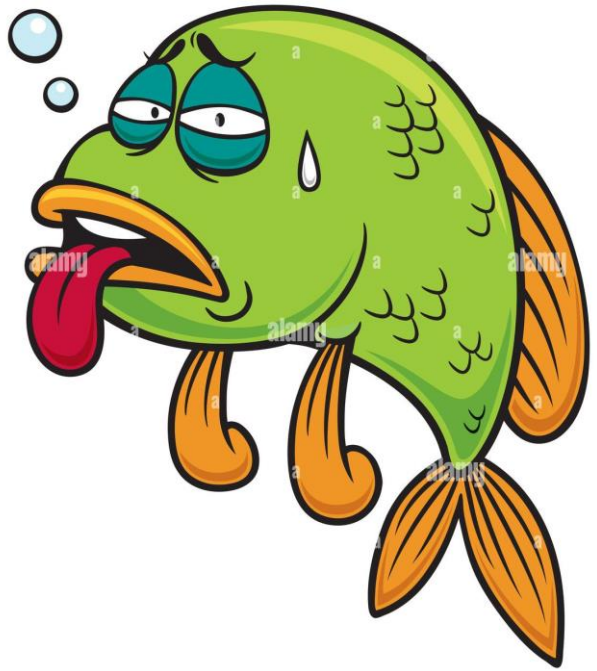
- Replicate The Pilot 'One Stop Border Post' Program At Chirundu Border Post. **UNIDO**
- Soft Infrastructure Support To Fishing Vessels On Lake Kariba. **WWF**
- Standards And Quality Assurance Practices And Protocols Developed And Harmonized. **ARSO**
- Business Support Institutions (BSIS) Capacity Building. **UNIDO.**
- Support For The Cold Chain Through Provision Of Three (3) Ton Refrigerated Truck. **SADC Secretariat.**
- Joint Blue Economy Strategy Between Zimbabwe And Zambia And An Investment Plan For Lake Kariba **FAO**

National Blue Economy Strategy Development

- Draft Blue Economy Strategy (DBES) For Zimbabwe Was Developed.
- National Stakeholder Consultations On DBES

Disease Management and Animal Health

- Aquatic Animal Health/ Fish Disease Management is largely based on **Biosecurity**
- **Common fish diseases:** Columnaris Disease or “Cotton wool” disease, Edwardsiellosis, Fin rot (*Aeromonas fluorescence* and *Pseudomonas putrifacien)*



Disease Management and Animal Health

Challenges in disease management and food safety? Anti-microbial resistance (AMR)

Strategies put in place?

- Zimbabwe developed a One-Health National Action Plan (NAP) for AMR.
- AMR Strategy for Zimbabwe (Draft)
- Antimicrobial Susceptibility Testing (AST) training for Laboratory personnel at CVL and Provincial Veterinary Laboratories & other labs
- Fleming Fund/ FAO capacitation of selected Human & Animal health & Environment Labs, these were commissioned.

Biosecurity Initiatives:

- National Aquatic Animal Health Strategy (Draft)
- National Hatchery Management guidelines (to be launched this year)
- Biosecurity guidelines for large & medium to small scale farmers were developed

Breeding Strategies and Genetic Diversity

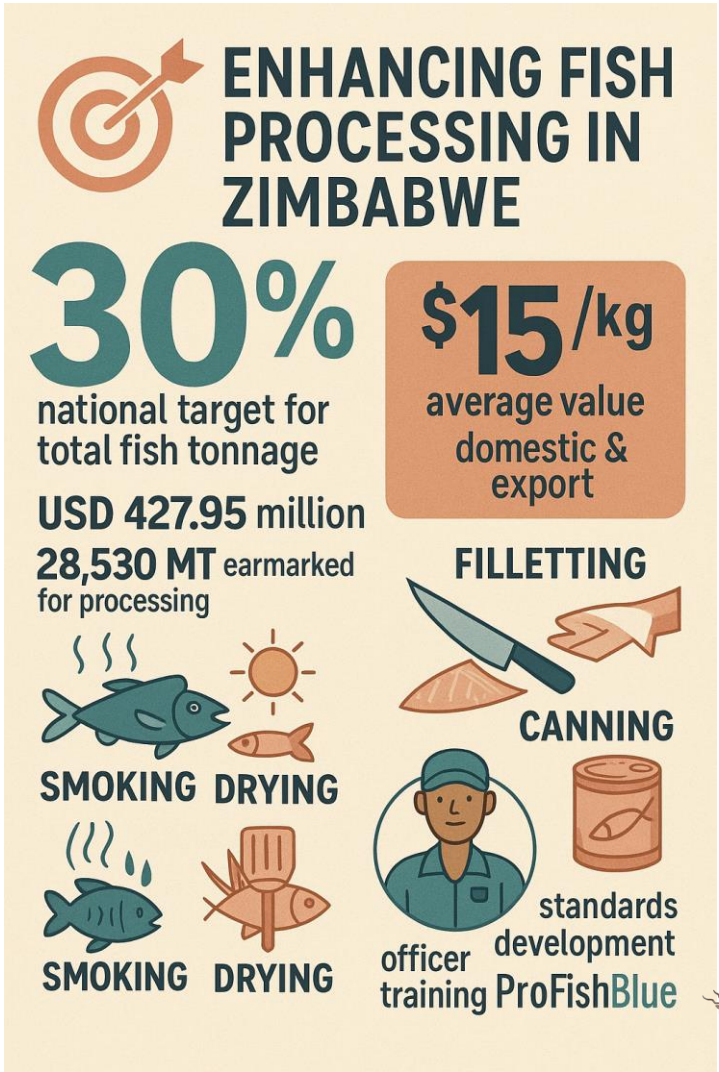
Area	Description	Implementing Partner	Status
1. Genetic Improvement of indigenous fish species using selective breeding techniques	The establishment and maintenance of strong indigenous genetic resources through selective breeding. Traits selected for: Growth Species of concern: *C. rendalli, O. andersonii*	GOZ, UZLKRS, UZ, RCZ	Ongoing
2. Breeding and selection of Green-head tilapia for commercial production in cooler regions of Zimbabwe	Study on breeding of *O.macrochir* to explore complementarity to Nile tilapia in warmer and cooler climates Traits of concern: high fecundity, growth and cold tolerance Species of concern: *O. macrochir, O. niloticus*	GOZ, FAO	Ongoing
3. Conservation of indigenous species programme	The establishment and maintenance of strong indigenous genetic resources. In-situ and ex-situ conservation in select dams and government breeding sites Species of concern: *O. mossambicus, C. rendalli,* and *O. macrochir*	GOZ	Ongoing
4. The efficacy and timing of hormonal sex reversal and exploration of alternative sex reversal techniques in indigenous tilapia	Study on efficacy of commercial hormone for monosex populations in tilapia. Trial for cheaper alternatives such as green light irradiation and plant based aphrodisiacs Species of concern: *O. niloticus, O. mossambicus, C. rendalli,* and *O. macrochir*	GOZ, UZ, RCZ	Ongoing

Fish Feed Strategies and Nutrition

- The sector primarily relies on commercial feed, with a few farmers making use of supplementary feeds such as household wastes, and aquatic weeds.
- Feed costs account for up to 70% of total aquaculture production expenses.
- There is reliance on imported raw materials such as fishmeal, however feed is locally produced.
- **Strategies**
  - Exploration of catfish farming for fishmeal production to reduce reliance on expensive imports.
  - Black soldier fly production trial under the FISH4ACP project proving feed costs can be reduced by up to 40% while maintaining fish growth performance.
  - Training on use of unconventional fish feeds

Food Safety, Post Harvest Preservation and Prevention of Post Harvest Losses

- ProfishBlue Project-Standards and Quality Assurance practices and protocols development and harmonization **(ARSO).**
- **National target-** Process 30% of total fish tonnage for value addition
- **Post harvest preservation:** Gutting, smoking, and drying (small-scale producers)
  - filleting and canning (larger operations)
- The government is promoting international standard processing techniques, with officers trained under TOT.

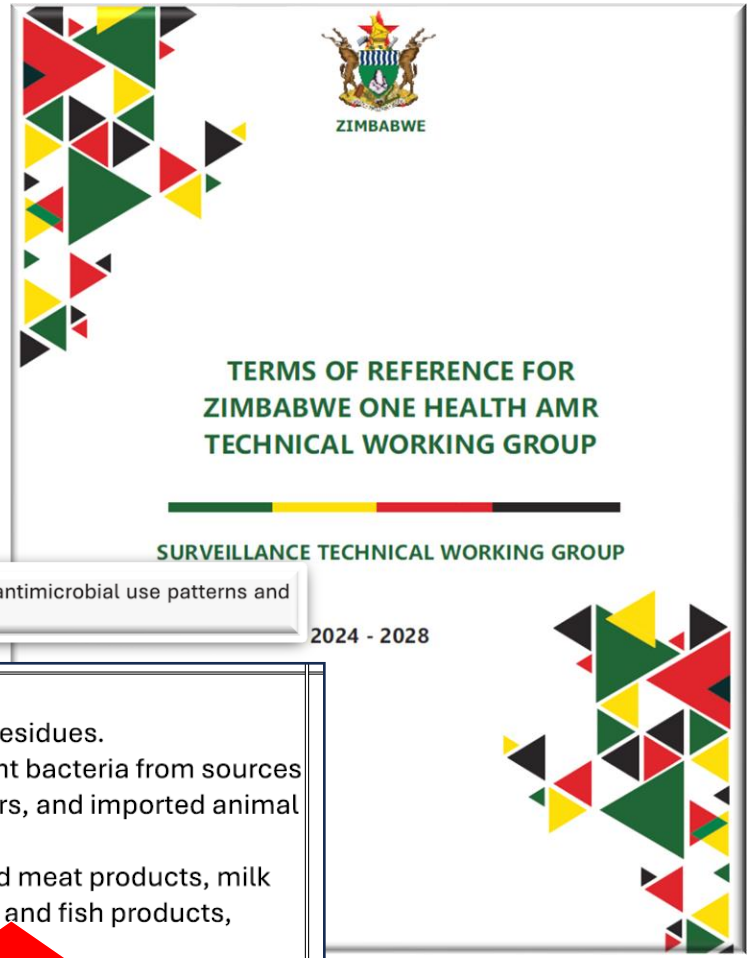


Food Safety, Post Harvest Preservation, and Prevention of Post Harvest Losses

- **Advancing cold chain infrastructure:** Receipt of a 3-ton refrigerated truck from SADC under the PROFISHBLUE project in 2025.
- **Pilot cold chain facilities:** Under FISH4ACP project, pilot cold chain facilities are being developed.

Zimbabwe's One Health Approach to Combating Antimicrobial Resistance

- **Zimbabwe's first NAP (2017–2021) established a One Health AMR framework covering aquaculture.**
- **Second NAP (2024–2028) launched, expanding focus to aquaculture, plant health, and environmental surveillance. Purpose: Align multi-sector actions to mitigate AMR through awareness, surveillance, biosecurity, and stewardship.**



Strategic objective 2 – Surveillance: Improve detection and understanding of the AMR and antimicrobial use patterns and trends through surveillance

2.6 Collect and test samples in the animal and food sectors

2.6.1 Design statistically sound surveys and tests for AMR and antimicrobial residues.

2.6.2 Collect and culture clinical and post-mortem samples to detect resistant bacteria from sources such as domestic and wild animals, milk samples, meat samples from abattoirs, and imported animal products.

2.6.3 Collect and test samples in the food lab for resistant bacteria in meat and meat products, milk and milk products, water, ready-to-eat food, poultry and poultry products, fish and fish products, cereals, and condiments.

2.6.4 Survey and test samples of honey, beef, poultry, eggs, pork, dairy [illegible]n, and fish for antimicrobial residues.

2.6.5 Analyse and report results.

Annotated Bibliography

Title & Citation	Summary
Gufe *et al.* (2019) – *Antimicrobial Profiling of Bacteria Isolated from Fish Sold at Informal Market in Mufakose, Zimbabwe. International Journal of Microbiology* Wiley Online Library +14	Surveyed 36 tilapia samples from a Harare informal market; detected multidrug-resistant bacteria including *E. coli*, with resistance to ampicillin, tetracycline, erythromycin, etc., highlighting AMR presence in consumer fish.
Utete (2013) – *Impact of Aquaculture on Water Quality in Lake Kariba* Aqua Publisher epe.lac-bac	Measured elevated nitrates, turbidity, ammonia, and reduced dissolved oxygen at effluent points; these environmental stresses may facilitate AMR proliferation and persistence.
One Health Trust (2017) – *Situational Analysis of Antimicrobial Use and Resistance in Zimbabwe* One Health Trust	National baseline for AMU and AMR across humans and animals; provides foundational insights into antibiotic use behaviors that may extend to aquatic systems.
Moffo *et al.* (2024) – *Antimicrobial use, residues and resistance in fish production in Africa: a systematic review. BMC Veterinary Research* PMC	Continental meta-analysis showing widespread resistance in African aquaculture to common antibiotics (e.g., tetracyclines, ampicillin); contextualizes Zimbabwe within regional trends.
Moffo *et al.* (2024) – *AMR profiles of E. coli and Staphylococcus in locally produced vs imported fish* ScienceDirect	Comparative study indicating higher AMR in locally farmed fish vs imports; relevant for local food safety and trade implications (Africa-wide).
Sibanda (2023) – *Aquatic Disease Situation in Zimbabwe & AMR Reporting (WOAH/AGISAR)* WOAH - Africa	Presents integrated AMR surveillance data across human, animal, and food sectors. Includes insights into laboratory capacity, sample challenges, and AMR drivers—though not aquaculture-specific.


International Journal of
Microbiology
Forward
Series
BMC Veterinary
Research
BMC
SITUATION ANALYSIS
OF ANTIMICROBIAL USE AND RESISTANCE
IN HUMANS AND ANIMALS IN ZIMBABWE
World Organisation
for Animal Health
Training of National Focal Points for
Aquatic Animal Health (Cycle IV)
2 - 4 October 2023 Kigali, Rwanda

CONTRIBUTING TO GLOBAL DATABASES

World Organisation for Animal Health | ANIMUSE

Country initiatives in addressing AMR in Aquaculture

- Zimbabwe's aquaculture sector addresses AMR and AMU through draft national strategies, emphasising One Health, education, surveillance, infection prevention, rational use, and sustainable investment. Capacity building includes AST training at CVL, provincial labs, and FAO/Fleming Fund–supported facilities.
- Biosecurity efforts feature a draft National Aquatic Animal Health Strategy, checklists, and farmer guidelines.
- Key hazards are antimicrobial residues and resistance, with intensification increasing risk. Former antibiotics (oxytetracycline, aquaflor, romet 30) were replaced by vaccination against *Lactococcus garvieae* at Lake Harvest since 2017/18 which is an example of using good practices and vaccination instead of Antimicrobials.
- Gaps include no farm-level AMU/residue monitoring, weak legislation, and poor coordination. Proposed actions: funding, legal reforms, stakeholder engagement, and environmental surveillance.

LINKS TO PUBLICATIONS

- https://doi.org/10.1155/2019/8759636
- https://www.researchgate.net/publication/235945329_Impact_of_Aquaculture_on_Water_Quality_in_Lake_Kariba_Zimbabwe
- https://onehealthtrust.org/wp-content/uploads/2017/10/SITUATION-ANALYSIS-OF-ANTIMICROBIAL-USE-AND-RESISTANCE-IN-HUMANS-AND-ANIMALS-IN-ZIMBABWE-1.pdf
- https://doi.org/10.1186/s12917-024-04158-w
- https://rr-africa.woah.org/app/uploads/2023/10/39-sibanda-zimbabwe.pdf
- https://www.youtube.com/watch?v=PCN8ul1KHMY
- https://www.africanresearchers.org/how-aquaculture-is-transforming-rural-livelihoods-in-zimbabwe-a-case-study-of-seke-rural-district/
- https://www.fao.org/africa/news-stories/news-detail/fao--government-partner-to-tackle-aquaculture-challenges-in-zimbabwe/en?utm_source=chatgpt.com

World Organisation for Animal Health

UN environment programme

The Fleming Fund

UK Government

World Organisation for Animal Health